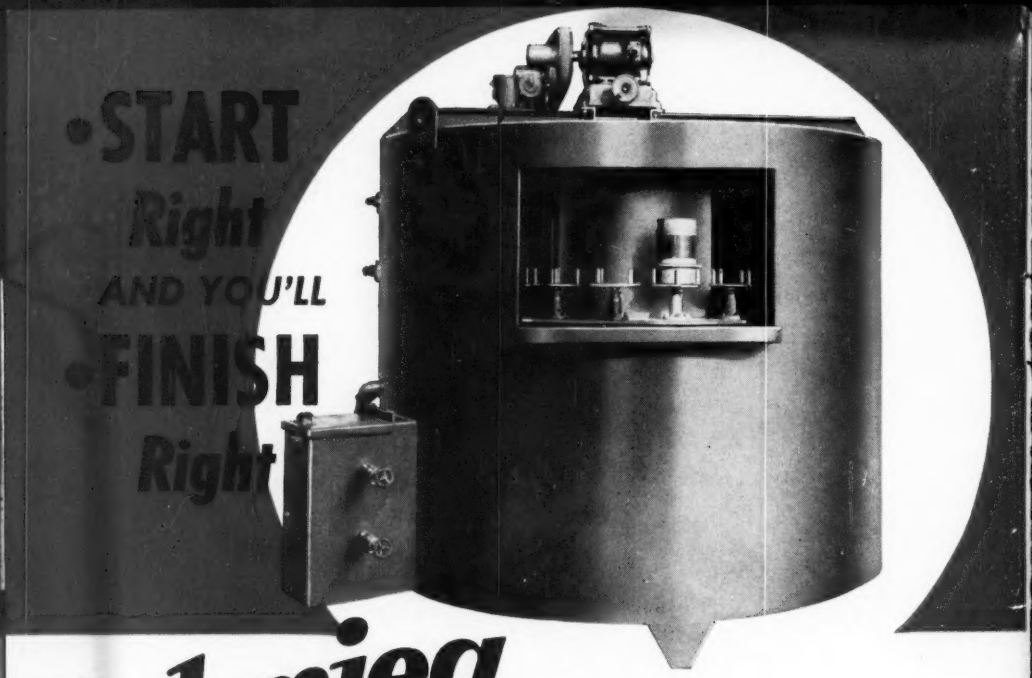
Products Finishing

CLEANING
PLATING
POLISHING
FINISHING

DECEMBER 1950



Schmieg CENTRI MERGE WASHERS

FIRST *Step* • FIRST *Choice* • *In* FINISHING

You start right when you call upon Schmieg engineers for mechanical washers to fit your specific production requirements. And that's why you finish right, too. Because Schmieg washers are designed and engineered to give you high production cleaning, long trouble-free performance at low operating cost.

There's a Schmieg washer for any kind of job, a washer that will save floor space and can probably be loaded and unloaded by one man. Available in manual and automatically loaded types.

Convenience is emphasized in Schmieg washers, no matter what type—convenient controls, variable speed drives, doors that permit quick access to interiors for ease of maintenance.

No wonder Schmieg washers are first step and first choice in finishing!

Start right now by consulting Schmieg engineers for your washing requirements.

THE *best* AIR PURGE *is* CENTRI MERGE

Schmieg INDUSTRIES INC.

Engineers & Manufacturers

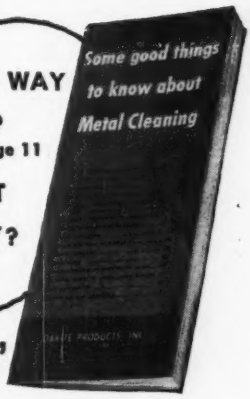
3144 MIQUETTE AVENUE • DETROIT 2, MICHIGAN

Oakite's New FREE Booklet

"Some good things to know about Metal Cleaning"

WHAT'S THE FASTEST WAY TO CLEAN METAL?
See page 11

WHAT'S THE MOST ECONOMICAL WAY?
See page 9



answers many questions that mean better production for you, more money in your pocket. You'll want to read more about:

Can one cleaning material do all metal-cleaning jobs? See page 5.

What kind of cleaner attracts both oil and water? How does this help to remove buffing compound residues and pigmented drawing compounds? See page 8.

What are the advantages of reverse current for electrocleaning steel? See page 15.

Can you electroclean brass without tarnishing? See page 18.

Can you clean steel and condition it for painting for less than 20 cents per 1,000 square feet? See page 26.

Would you like a cleaner that removes rust and oil in one operation, often eliminating all need for pickling. See page 28.

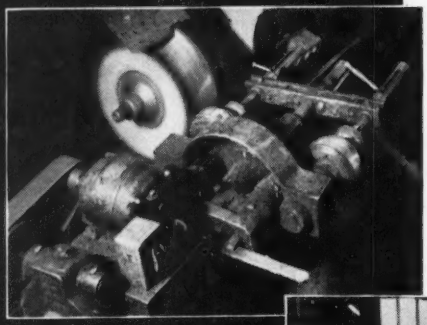
Does your burnishing barrel produce a luster you are proud of? See page 32.

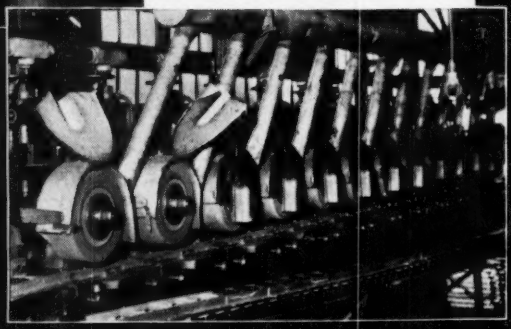
FREE For a copy of this 44-page illustrated booklet, write Oakite Products, Inc., 20 Thames St., New York 6, N. Y.

Technical Service Representatives in Principal Cities of U. S. & Canada

OAKITE SPECIALIZED INDUSTRIAL CLEANING MATERIALS • METHODS • SERVICE

Better Results for *LESS* . . .
on *EVERY* Polishing Job





with ALUNDUM Polishing Abrasive

YES, for better results on offhand, semi-automatic and automatic polishing operations, specify cost-cutting ALUNDUM Polishing Abrasive.

- For fast cut on roughing operations—where cement is the adhesive — specify S-treated ALUNDUM Abrasive.
- For a general purpose abrasive for roughing or finishing —where long life is of primary importance — and where the wheel is set up with cement or glue—specify B-treated ALUNDUM Abrasive.
- For finishing operations, where glue is the adhesive, specify R-treated ALUNDUM Abrasive.

NORTON COMPANY
Worcester 6, Mass.
Distributors In All Principal Cities

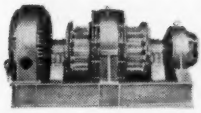
NORTON
ABRASIVES

G-222

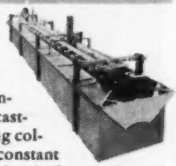
Look

before you leap

when you buy plating and polishing equipment and supplies



Always thoroughly investigate low-voltage generators. Check if brush holders are fully insulated; if longer brush life is assured by a copper pigtail bar which eliminates current passage through springs and fingers. For optimum commutator efficiency, insist on copper graphite brushes, on moulded-in "equaload" shunts for equal distribution of loads and reduction of resistance. Only when all these features are present can you be sure of trouble-free, economical commutation. You'll find them and more in H-VW-M Low-Voltage Generators. Bulletin G-102 describes them.

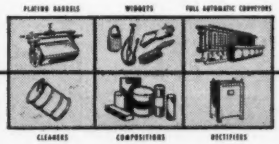


Look for two vital features in Semi-Automatic Conveyors. One—rugged carriers for easy handling of heavy forgings and castings as well as self-lubricating collector fingers—to insure constant contact when handling light, bulky or buoyant stampings. Two—for several motions of work—rotation, horizontal oscillations or composite motions. These add up to improved, super-accurate deposit distribution. These "musts" for better plating are built into H-VW-M Semi-Automatic Conveyors, explain their reputation for dependability and trouble-free service. Bulletin SA-101 has complete details.

Be sure the buffs you buy are right for the job. H-VW-M uses only the highest quality textiles and, through more than eighty years of experience has developed many exclusive manufacturing operations. Result—H-VW-M Buffs assure better conveyance of composition, less buff raveling, longer life through high resistance to abrasive wear. All H-VW-M Buffs are finished with Red-E-to-Use face, assuring perfect balance and requiring no initial raking. Single and double folded Triplex construction adds extra strength and stiffness plus a maximum number of thread ends bearing on the metal. Send for Bulletin BC-104.

Always look behind the surface . . . and always look to H-VW-M for what you want when you want it . . . H-VW-M products are strategically warehoused for prompt service and delivery . . . H-VW-M sales-engineers and laboratory technicians are always available for help in your production problems. It is this overall service and experience that have made H-VW-M *the central source of supply . . . for over 80 years . . . for all the needs* of the electroplating and polishing industry.

HANSON-VAN WINKLE-MUNNING COMPANY, Matawan, N. J.
Plants at: Matawan, N. J. • Anderson, Indiana • *Sales Offices:* Anderson Chicago • Cleveland • Dayton • Detroit • Grand Rapids • Matawan Milwaukee • New Haven • New York • Philadelphia • Pittsburgh Rochester • Springfield (Mass.) • Stratford (Conn.) • Utica



SINCE 1880

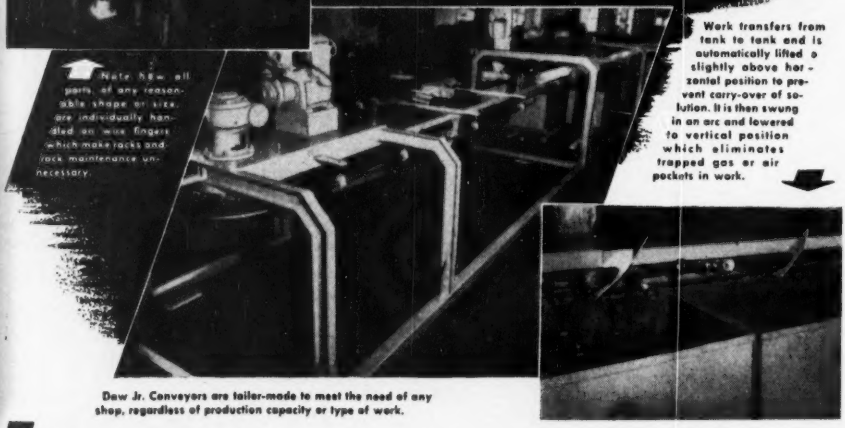
H-VW-M

Manufacturers of a complete line of electroplating and polishing equipment and supplies

7026

More Production - Better Plating Increased Profits WITH DAW Jr. Type

FULL AUTOMATIC PLATING CONVEYOR



Note how all parts, of any reasonable shape or size, are individually handled on wire fingers which make racks and rack maintenance unnecessary.

Work transfers from tank to tank and is automatically lifted o slightly above hor - zontal position to prevent carry-over of solution. It is then swung in an arc and lowered to vertical position which eliminates trapped gas or air pockets in work.

Daw Jr. Conveyors are tailor-made to meet the need of any shop, regardless of production capacity or type of work.

Every installation of the completely automatic Daw Jr. Conveyor is one especially built to fit the individual requirements of any desired production capacity or any plating cycle. The continuously moving cathode eliminates entirely all interruptions in work movement and permits the use of considerably higher current densities which greatly increase work speed, assure more uniform plating, cut profit-eating rejects and reduce production costs.

The Daw Jr. does away with expensive racks and rack maintenance although small racks can be used if desired. Unloading is entirely automatic but can be dispensed with during certain plating operations if shape or size of parts make this feature impractical.

Daw Jr. Conveyors offer fully automatic plating, bring greater output of finer work and increased profits within the reach of every average sized shop.

WRITE TODAY FOR DETAILS

LASALCO, INC.

2822-38 LASALLE ST. GRand 2990 ST. LOUIS 4, MISSOURI

EZRA A. BLOUNT, *Editor*

Products finishing

DECEMBER 1950

VOLUME 15 • NUMBER 3

CONTENTS

Greetings of the Season 9
Editorial

Molten Caustic Bath Provides Rapid, Efficient Method of Cleaning Steel Parts for Painting 10
By James E. Fritts

Plating Without Nickel Chloride 18

Filter Out Your Plating Rejects 24
By Ezra A. Blount

Spotlighting Finishing Progress
By Dr. Allen G. Gray

—**Reactions of Resins with Drying Oils Have An Important Effect on Finishes** 48

—**Tin Plate As Undercoat for Paint** 54

—**Rhodium Plating Provides a Non-Tarnishing Finish** 56

—**Finishing Beryllium Copper Parts** 58

—**Protective Coating for Molybdenum** 60

Practical Applications of Modern Products

—**Polishing and Finishing True Temper Products** 66
By N. J. Benton

—**Overhead Electric Radiant Oven Aids Gasoline Engine Production** 68

—**Continuous Conveyor Makes Possible Efficient Cleaning, Dip Coating, and Baking of Folding Metal Chairs** 70

Suggestion Improves Finishing Process 76

News of the Industry 78

Finishes That Aid in Appearance and Utility 98

New Equipment, Materials, Processes 100

Article Index, 1950 119

The Finishing Touch 124

Opportunity Section 125

Catalog Library 126

Index to Advertisements 128

ROBERT I. SHORE
Associate Editor

H. LEROY BEAVER
ALLEN G. GRAY
BRYANT W. POCOCK
Consulting and Contributing Editors

GENE J. SCHWARBER
Advertising Manager

NORMAN S. ROGERS
Art Director

A. J. WALKER
Circulation Manager

ADVERTISING REPRESENTATIVES

RICHARD S. KLINE
GEORGE E. HAY
431 Main St., Cincinnati 2
MAin 0182

G. M. FILLMORE
342 Madison Ave., New York 7
Murray Hill 7-7390

CHARLES H. DEILY, JR.
351 Mattison Ave., Ambler, Pa.
Ambler 0339

JOHN M. KRINGS
Tribune Tower, Chicago 11
DElaware 7-5441

THE ROBERT W. WALKER CO.
684 S. LaFayette Park Place
Los Angeles 5
DUnkirk 7-4388
69 Post Street, San Francisco 4
SUtter 1-5568

MEMBER

CCA

NBP

Published monthly and copyrighted (1950) by

GARDNER PUBLICATIONS, INC.
431 Main Street, Cincinnati 2, Ohio
Printed in U.S.A.

Palladium

PLATING SOLUTION

FOR ELECTRONIC APPLICATIONS

Ours is a self-sustaining solution, working from anodes. Gives excellent results in plating connectors, wave-guides and other electronic equipment where specified.

We make the anodes, too.

Baker & Co., Inc.

113 ASTOR ST., NEWARK 5, N. J.

New York • San Francisco • Chicago

ONE MAN OPERATION with BLAKESLEE METAL PARTS WASHERS

BLAKESLEE SOLVENT VAPOR DEGREASERS
—economical, efficient—
USE LESS SOLVENT

BLACOSOLV
Stabilized Degreasing Solvent — one price, one solvent *for all metals*

Blakeslee's new washer saves labor, is economical

Just one man can keep the production line going with this time saving metal parts washer. Turn table operation permits loading and unloading in one easy pivot movement. One revolution of the washer turn table and parts come out sparkling clean for a better finishing job with fewer rejects. Blakeslee washers are designed for every type and size of plant operation. Write for the cooperative services of our engineer-trained sales representatives.

G. S. BLAKESLEE & CO.

1844 S. 52nd Avenue • Chicago 50, Illinois

New York, N. Y. Toronto, Ont.

EXTRAORDINARY

Technique and experience make for a pleasing, eye-catching composition . . . talent behind the camera brings the extraordinary in photographs.

Developing finishes of distinction also falls into this line of thinking. It takes know-how and keen perception to conceive coatings that will fully emphasize the salient features of diversified products.

So . . . if you desire to escape the ordinary, and want an extraordinary finish for your merchandise, place your specifications with the talented artists in our Creative Studio. They will produce for you an individual coating that gives the utmost in satisfaction . . . both from the standpoints of beauty and serviceability.

Your inquiry will start a relationship that can be mutually beneficial. No obligation for an analysis of your finishing problem.

No Tampering with Quality

ROCKFORD VARNISH *Company*
ROCKFORD, ILLINOIS

Affiliate
GORDON BARTELS CO.
Roller Coating Specialists

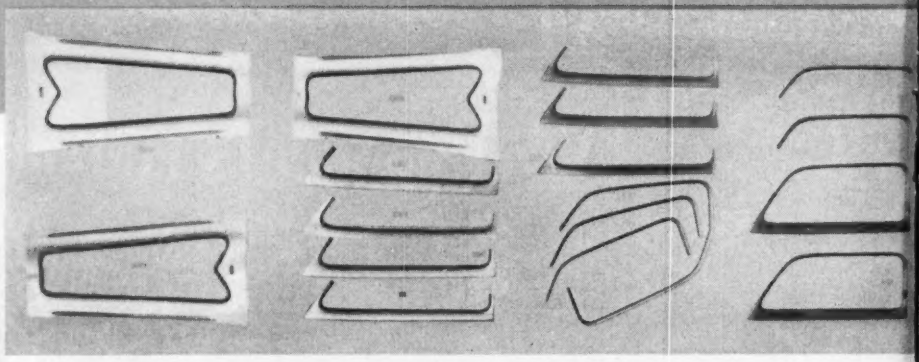
Manufacturers of Protective and Decorative Coatings

Greetings of the Season

From the staff of

PRODUCTS FINISHING

Molten Caustic Bath Provides Cleaning Steel



Display panel showing results of progressive operations in the fabrication of a typical interior molding.

A newly developed prepaint cleaning cycle for steel parts involves the use of a bath of molten caustic soda. Paint may also be stripped from rejected parts in the same processing cycle. Details of this interesting operation are described in this article.

PLANT layout for maximum production efficiency must provide for maximum production from the floor space available and the fewest, simplest processing operations. The answer of process engineers of the Ternstedt Manufacturing Division, GMC, Columbus, Ohio, to this set of requirements, as applied to prepaint treatment of steel, has been the development and installation of an automatic conveyorized cleaning cycle combining a molten caustic soda bath with necessary rinses and a phosphoric acid dip.

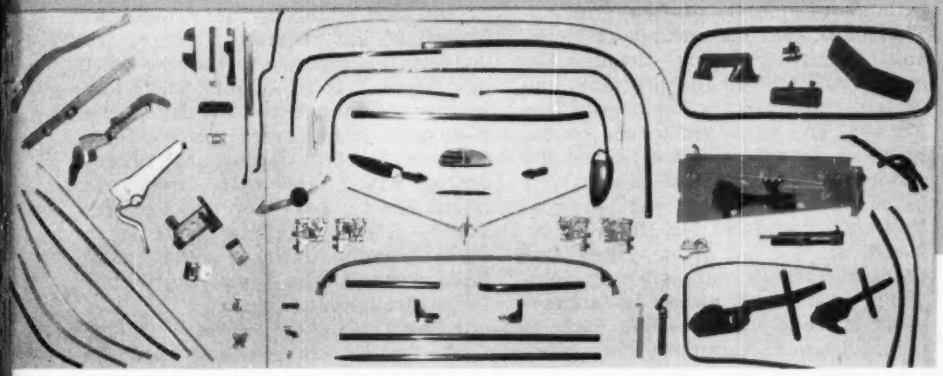
The Columbus, Ohio plant of Ternstedt manufactures a number of steel parts for several General Motors cars, among them inner garnish moldings, front and rear door inner moldings, inside windshield and rear window moldings, and seat backs (see article heading). These parts, stamped and formed from 0.035-inch cold rolled steel, are cleaned and painted with one coat of a high-bake alkyd metallic synthetic enamel at the rate of 40,000 parts per day. One cleaning cycle produces parts in sufficient quantity to supply three automatic spray painting and baking units.

Manufacturing Process Outline

Steel parts, after fabrication, are conveyed to the cleaning and painting area on several transport conveyors and are unloaded onto a storage conveyor which transports the parts to the loading end of the automatic prepaint cleaning machine (see Fig. 1). At the loading end of the cleaning machine, parts are transferred from the storage conveyor to racks attached to cross arms, and are then carried automatically through the entire cleaning process. Clean, dry moldings emerging at the unloading end of the cleaning machine are hung on overhead chain transport conveyors traveling 17 to 20 ft./min., which carry them to the spray painting and baking area. Each molding is hung on a special carrier attached to one of three overhead con-

Rapid, Efficient Method of Parts for Painting

By JAMES E. FRITTS
Engineer in Charge—Process
Ternstedt Division, General Motors Corporation
Columbus, Ohio



Moldings and other automobile accessories manufactured by the Ternstedt Columbus plant.

veyors, each of which circles through a water-wash spray booth having a capacity of 2000 pieces per hour, in which automobile moldings are sprayed automatically. The paint conveyors each circle past the loading end of a Newcomb-Detroit gas-fired oven equipped with Burdett infra-red gas burners. A chain-driven cross-rod conveyor carries the painted parts through the oven. The synthetic metallic finish is baked in 10 minutes at 340 deg. Fahrenheit.

Moldings emerging from the oven are transferred to a cooling conveyor which circles past three inspection and assembly belts so that the proper part may be unloaded onto the proper inspection belt conveyor. Progressing through assembly and final inspection, the moldings are packed for shipment to the various General Motors assembly plants concerned.

The Cleaning Process

The function of the prepaint cleaning cycle is to remove the non-pigmented drawing compound left on the steel parts as a result of forming operations, and produce on the clean metal surface a thin, inert, phosphate film which promotes paint adherence and resists corrosion.

The cleaning process is carried out in a series of tanks arranged in a straight line so that a chain-driven, cyclic-type, cross-rod conveyor can transport moldings through all the steps in the cycle. The installation occupies a floor space of 72 feet by 12 feet and is almost completely enclosed in an overhead canopy so that objectionable vapors from the process may be exhausted. The conveyor is set to move periodically so that parts are permitted to remain in each processing solution for 50 seconds. The travel time from one step in the cycle to the next is 19 seconds. Depending upon the part being processed, the capacity of the cleaning cycle is between 4,250 and 5,200 moldings per hour.

The operations comprising the cleaning cycle are described below.

1. Molten Caustic.

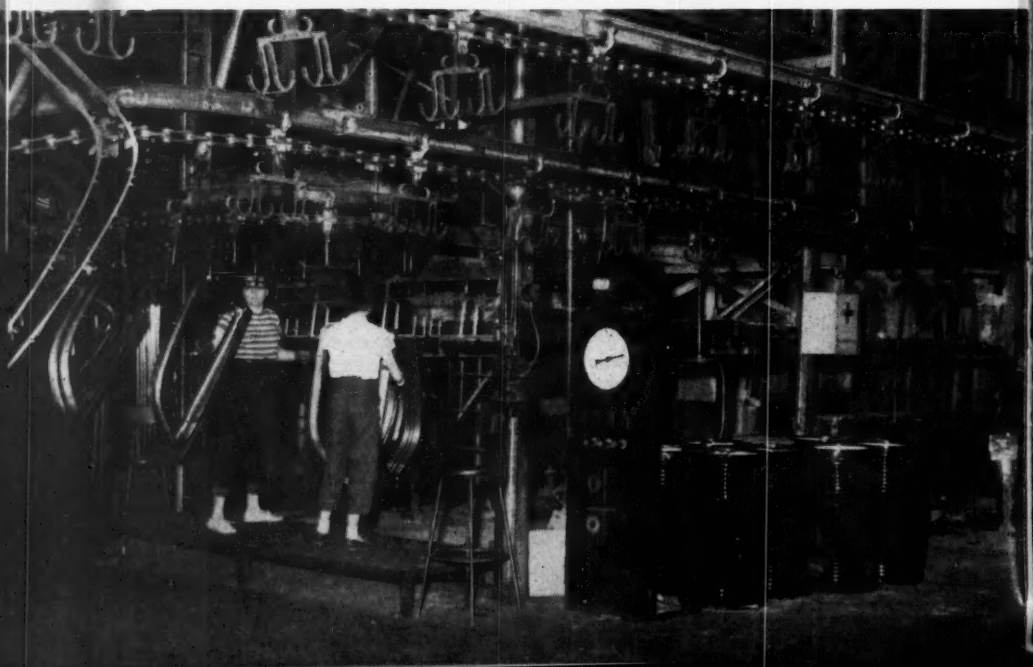
The molten caustic soda bath is the well-known Ajax Hultgren type which, when charged with the proper salt mixture, is used extensively throughout industry for heat treating. The continuous chain conveyor mechanism carries the parts through the molten caustic bath, quench tank, and various rinse tanks automatically (see Fig. 2). The parts are loaded on the racks supported by each cross rod and submerged in the molten caustic soda bath operated between the temperatures of 720 and 780 deg. F. (see Figs. 3 and 4). As can be imagined, this bath will remove any drawing compound or shop dirt almost instantaneously so that the 50-second cycle is ample time to ensure a chemically clean steel surface.

The bath containing the molten caustic is 4 feet long by 9 feet wide by 5 feet in fluid depth and contains 21,675 lb. of caustic soda when fully charged. The tank is enclosed in a single course of fire brick which is protected by steel plates bolted around the entire installation. The total connected load of the furnace is 360 kw. Three 120 kw., 3-phase transformers convert this directly to the low voltage range of 10 to 15 volts. These low voltages are impressed directly on the nine sets of immersed electrodes in the bath. In operation, all heat is generated within the bath itself—the liquid caustic soda acting as a "resistor." Electromagnetic forces produce a vigorous stirring action in the bath, keeping the temperature uniform throughout.

2. Water Quench.

Steel parts are removed from the molten caustic bath and mechanically transferred to a steel water rinse tank

Fig. 1—A view of the loading end of the prepaint cleaning conveyor showing parts being transferred from a storage conveyor to hooks on a cleaning conveyor cross-rod. In the foreground may be seen the control panel containing cycle timer and other controls for the automatic process.



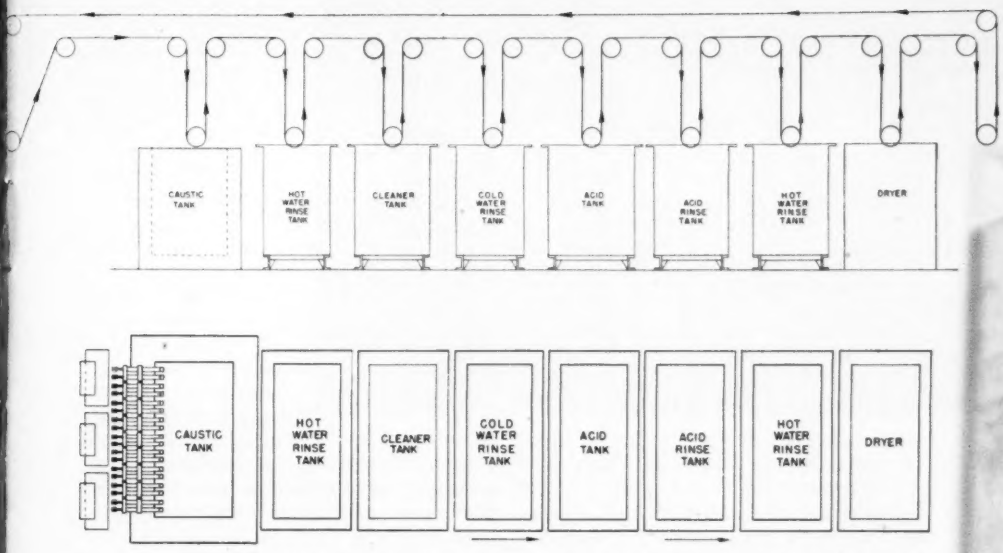


Fig. 2—Diagrammatic sketch showing side elevation (above) and plan view (below) of cross-rod cleaning conveyor together with the various steps in the prepaint cleaning cycle.

4 feet by 9 feet by 5 feet deep, fitted with a dam-type overflow and a surface water spray to assist in keeping the solution surface clean. This solution is operated between 150 and 180 deg. Fahrenheit.

3. Cleaner.

Steel parts are next immersed in a tank containing a water solution of Pennsalt No. 34 Cleaner, 0.6 oz./gal., operated at 180 deg. F. This solution is overflowed periodically to keep the tank surface clean, and is drained, flushed, and refilled once per day. The cleaner used is very strong in emulsifying power and acts as a wetting agent to assist in rinsing traces of caustic soda and any other chemicals from the surface of the steel.

4. Water Rinse.

The next step in the process is another continually-overflowing water rinse tank operated at 180 deg. F. This tank is also drained, flushed, and refilled each day. Moldings leave this solution with clean, chemically active surfaces.

5. Phosphoric Acid.

The clean steel parts are next immersed in a lead-lined tank, 4 feet by 9 feet by 5 feet deep, containing a solution of phosphoric acid maintained at a strength of 10-13 per cent acid and operated at 160 deg. F. A 50-second immersion in this solution is sufficient to etch the steel surface lightly and form a thin phosphate film. It has been found that this solution will perform its function satisfactorily for an entire month without recharging. Additions of phosphoric acid are made daily to maintain the acid concentration within the specified limits.

6. Acid Rinse.

Following the phosphoric acid dip, parts are immersed in a continually-overflowing warm water rinse. The pH of the following rinse tank is controlled by varying the rate of flow of water entering this steel, lead-lined tank.

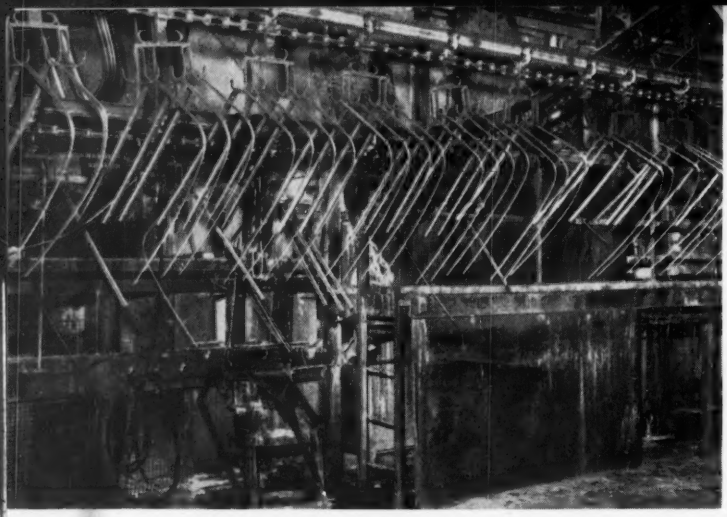


Fig. 3 — Cleaned, phosphatized, and dry moldings are conveyed along one side of the automatic cleaning conveyor enroute to a spray finishing unit. Behind the transport conveyor is located the electric furnace charged with molten caustic which constitutes the first step in the cleaning cycle.

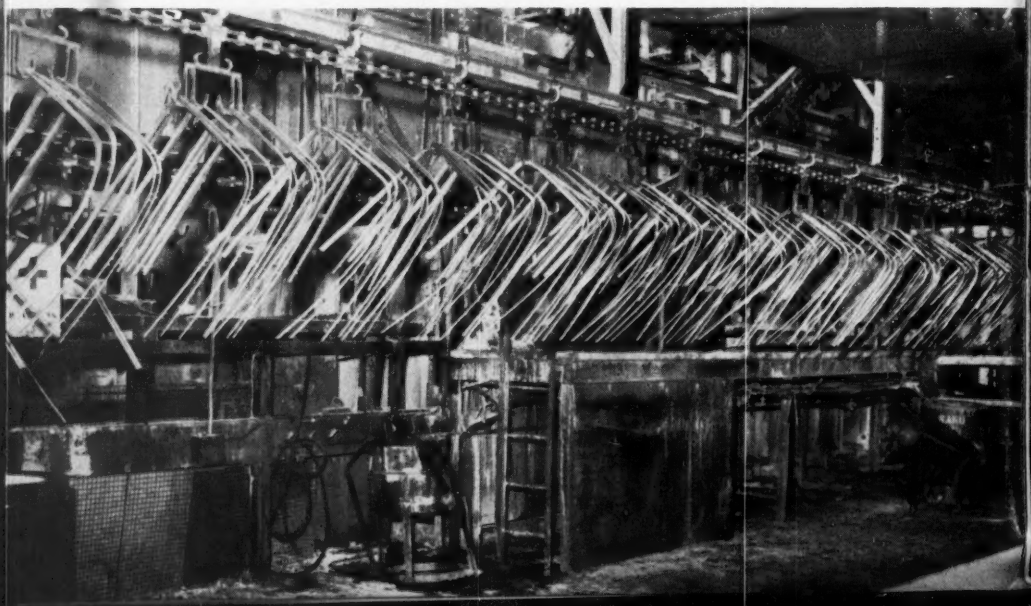
7 and 8. Water Rinse and Hot Air Dryer.

A final water rinse operated at 180 deg. F., at a pH between 5 and 6, completes the cleaning cycle. Parts after leaving this tank are processed through a hot air dryer so that they leave the end of the automatic prepaint cleaning machine clean and dry, ready to be unloaded onto transport conveyors carrying them to the spray painting and baking operations (see Fig. 5).

Notes On Equipment

The molten caustic tank, acid tank, and the various rinse tanks, and dry-

Fig. 4—A general view of one side of the automatic cleaning and phosphatizing setup for prepaint treatment of automobile moldings. The various tanks containing the processing solutions are concealed behind the canopy which assists in control and removal of fumes from the various solutions.



ing oven in the cleaning cycle, as well as the chain conveyor, were designed and built by the Ajax Electric Company, Inc., Philadelphia, manufacturer of electric salt bath furnaces. All the tanks are approximately 4 feet wide by 9 feet long by 5 feet deep. inside dimensions, and are plain steel tanks, except as specified otherwise. All tanks except the molten caustic, Pennsalt 34, and phosphoric acid are equipped with overflow weirs and water sprays at the solution surface to maintain a clean liquid surface.

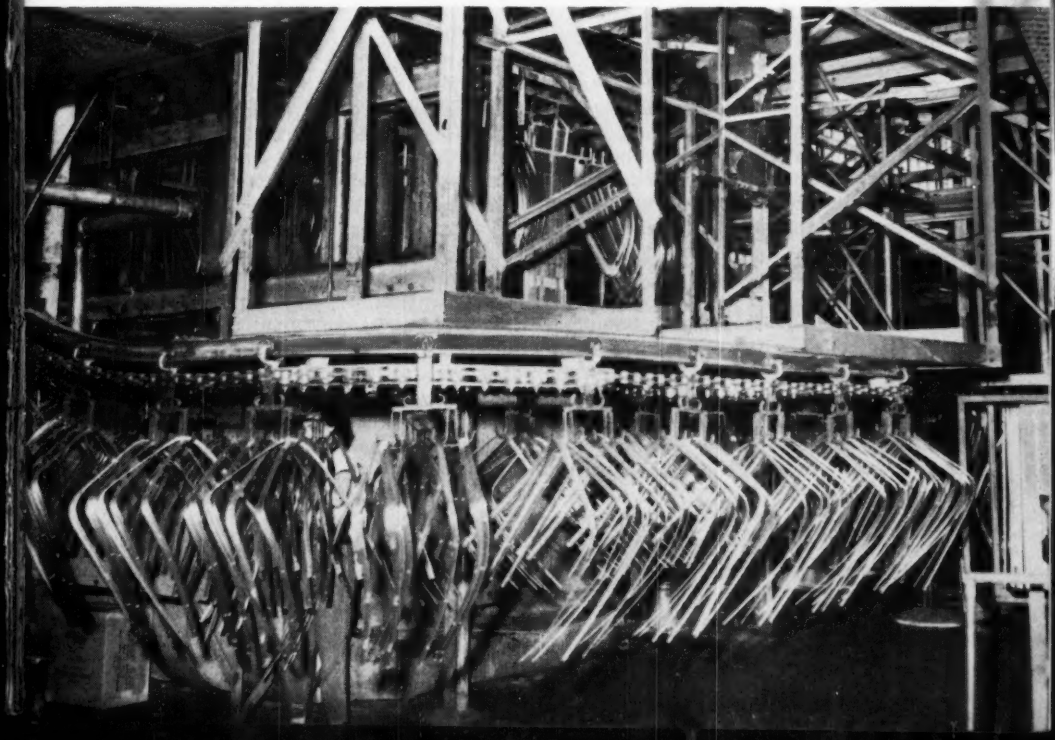
The phosphoric acid solution, the acid rinse, and the final rinse tanks are air-agitated by means of perforated pipes extending along the tank bottom. Air agitation promotes even, rapid etching and thorough rinsing by maintaining a rapid rate of solution circulation or flow over the steel surfaces of the moldings.

The phosphoric acid tank is heated by lead steam coils. Condensate from these coils is fed into the acid rinse tank to eliminate the chance that a break in the coil might cause acid injection into the steam boiler. Other solutions are heated by steam injectors operated in conjunction with automatic temperature controls.

The hot air dryer is constructed so that filtered air is withdrawn from the room, blown over high-pressure steam coils, and then upward over the moldings in process, thus removing the last traces of moisture.

The canopy over the entire cleaning cycle is fitted with an overhead exhaust duct in which a 48-inch propeller-type fan is mounted. In addition, fumes from the molten caustic tank are removed by a positive dis-

Fig. 5—A view of the unloading end of the automatic cleaning machine. In the background operator can be seen transferring clean moldings from the cleaning machine to the transport conveyor which carries them to the spray finishing department.



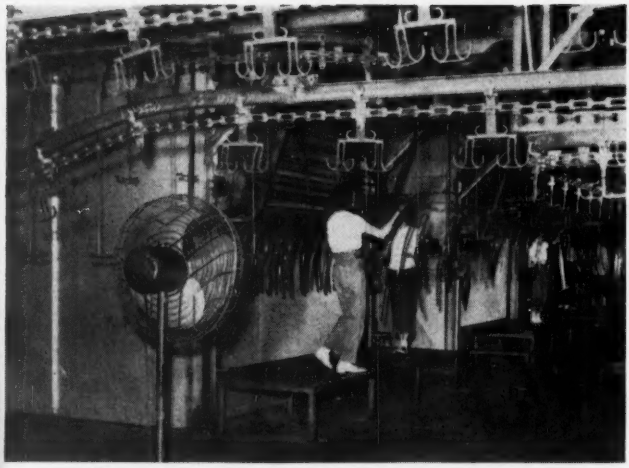


Fig. 6—After moldings have been sprayed with a metallic synthetic finish, they are removed from the paint conveyor and hung for baking in one of three Newcomb - Detroit infrared gas-fired baking ovens. Illustration shows loading end of one of the ovens. *(All photos by PRODUCTS FINISHING)*

placement fan and conducted through a scrubber which washes all traces of caustic soda from the air.

Process Control

Control of the cleaning process is maintained by a combination of chemical analysis with visual inspection. Caustic soda must be added to the molten caustic tank as needed to maintain the proper fluid level. The concentration of other solutions is checked by the manufacturing process laboratory and additions made to maintain optimum operating concentrations. The pH on the final rinse tank is checked with pH paper, and the flow of water in the preceding rinse tank adjusted accordingly (that is, pH too high—flow is decreased; pH too low—flow is increased).

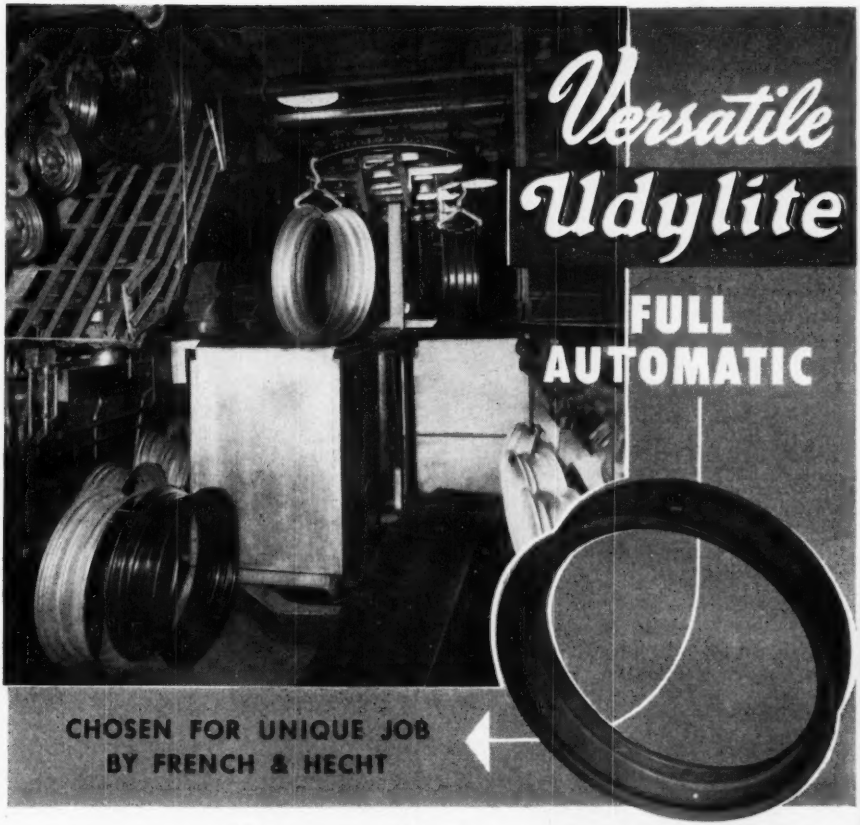
Although periodic replacement of the electrodes in the electrically heated molten caustic bath is required, the bath will operate several years without being cleaned and recharged with caustic soda. Current additions of caustic are made at the rate of 100 pounds for each 1,760 pieces processed through the cleaning cycle. Experience indicates that the phosphoric acid consumption is at the rate of about 8,000 pounds per month, during which time approximately 1,000,000 pieces have been acid dipped.

Paint Stripping

The removal of drawing compound from steel parts prior to painting consumes 90-95 per cent of the productive capacity of the cleaning cycle. The few rejected moldings which accumulate following the final inspection of the finished products may be processed through the same cleaning cycle as that used for raw steel. The molten caustic easily removes the high bake alkyd synthetic enamel in the 50 seconds that the parts are in contact with the caustic. This additional function of the cleaning cycle has proved of value in that the added paint stripping facilities which must usually be installed have not been required for the successful operation of this process. From the standpoint of material flow, the stripped parts emerge from the cleaning cycle at exactly the proper point to be loaded on transport conveyors and returned to the painting and baking operations (see Fig. 6).

Limitations of Molten Caustic Cleaning Method

The application of the molten caustic soda cleaning method is limited to steel parts so shaped that the caustic



Plating huge tractor wheel rims is quite an assignment for a standard model full automatic machine. But French & Hecht Division of Kelsey-Hayes Wheel Company reports splendid results with their Udylite equipment. This unique installation is just one example of the many varied applications of standard Udylite Full Automatics. They're being used to plate everything from cuff links to Diesel engine parts—in every type of finish—with every type of process.

The chances are that Udylite equipment is just what *you* need to answer *your* plating problem. Why not call in your nearby Udylite Technical Man today and let him tell you what Udylite equipment can do? Like many other companies, you may find the Udylite way the sure way to greater profit and lower per-unit cost in any metal finishing operation. Or write direct to The Udylite Corporation, Detroit 11, Michigan, for complete information. There's no obligation.

PIONEER OF A BETTER WAY IN PLATING

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

Better Protection For Your Workers . . . Higher Production For You!

U. S. DIPPED NEOPRENE CANVAS UTILITY GLOVES
Protect hands against cuts, splinters, abrasion, oils, mild acid solutions and disinfectants. Curved fingers . . . soft flannel linings. Knit wrists, or gauntlets.

U. S. DIPPED NEOPRENE INDUSTRIAL GLOVES
Rough-surface fingers for sure grip. Neoprene resists gasoline, oils, greases. Construction eliminates straining, pulling. Highly flexible. Full range of sizes, lengths and weights.
Available from your United States Rubber Company Branch.

U. S. INDUSTRIAL GLOVES

UNITED STATES RUBBER COMPANY

can drain from the parts quickly and rather completely. There must be no rolled or beaded edges or pockets that would entrap caustic. When solid caustic particles become trapped in crevices or pockets, rinsing is next to impossible, as well as hazardous. Parts must be so shaped that they will not nest, but will hang free when suspended in the caustic, even though racked to hang closely adjacent so that a high production rate may be attained. With these limitations however, the molten caustic soda cleaning and paint stripping method offers process engineers a rapid, economical method of preparing steel parts for painting.

Plating Without Nickel Chloride

WITH nickel chloride scarce at present, the question of a substitute has been raised many times recently. The essential function of nickel chloride is to furnish chloride ions to the plating bath. The chloride ion concentration must be maintained high enough to promote satisfactory anode corrosion.

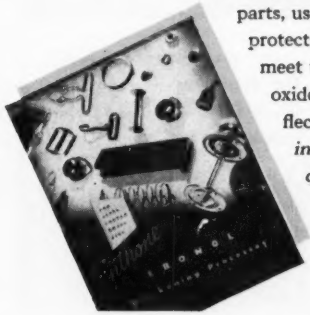
In low current density, room temperature plating solutions ammonium chloride, or perhaps under some conditions sodium chloride, can be used to maintain the correct chloride concentration. In warm or bright nickel solutions the presence of appreciable amounts of sodium or ammonium ions is objectionable. It is, therefore, necessary to use in these solutions chloride salts which are not combined with harmful metals or radicals. The only two materials which can be recommended at the present time are hydrochloric acid and magnesium chloride.

Hydrochloric acid can be used for adjusting the pH value of the bath when such adjustments are necessary. In most nickel solutions the pH tends to rise. Daily additions of sulfuric acid are required for pH control. If hydro-

GUN AND PISTOL PARTS COURTESY HIGH STANDARD MANUFACTURING CO.

Millions of Guns...

ammunition shells, cartridge clips, shoe eyelets, buckles, buttons, harness hardware, radar parts, used in World War II, received these government-approved, protective black finishes. Enthone Ebonol blackening processes meet today's Army, Navy and Air Force specifications for black oxide coatings on steel, copper, brass and zinc . . . for wear, reflectivity, saltspray, and weathering. NEW EBONOL Booklet *including detailed operating instructions, sent free on request. U.S. Patents*—2,364,993, 2,460,896, 2,460,898, 2,481,854. Canada, 463,852.



Enthone inc

442 ELM STREET NEW HAVEN CONN

chloric acid is substituted for sulfuric acid, the pH can be adjusted and the chloride ions increased simultaneously. By this method, the chloride concentration of a solution very low in nickel chloride cannot be brought up to normal immediately as this would result in an excess of acid. Over a period of weeks, however, the chlorides will increase until a sufficient quantity is present, at which time the use of hydrochloric acid can be discontinued and sulfuric acid employed in the usual manner. If an analysis indicates that the chlorides have dropped, hydrochloric acid may be used again.

If nickel carbonate is available, nickel chloride can be formed by neutralizing the carbonate with hydrochloric acid either in the plating tank, or with greater safety in a separate tank, in which case the solution can be filtered back to the main tank.

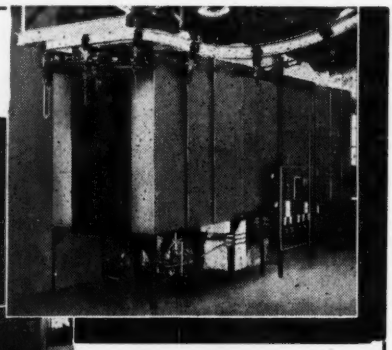
Either C. P. or Commercial grade hydrochloric acid can be used. Most dealers in heavy chemicals and acids will be able to furnish a grade low in heavy metal impurities. Eight-tenths (0.8) ounce of acid is equivalent to 1.0 ounce of nickel chloride; stating it in terms of pounds, eight pounds of acid will yield the same chloride concentration as ten pounds of commercial nickel chloride.

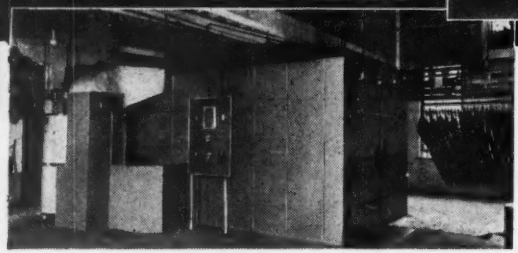
The other substitute for nickel chloride mentioned above is magnesium chloride. Magnesium ions are not harmful when the concentration calculated as magnesium chloride is below 3.0 ounces per gallon. In some cases a higher concentration has been used but there is some danger of forming hair-line cracks in the deposit. Magnesium salts have been used up to the concentration mentioned in cold and warm nickel solutions.

In using magnesium chloride (U. S. P. or C. P. grades), bear in mind that 0.85 pound of this salt is required to furnish an equivalent chloride concen-

for efficient straight-line production—get a

LANLY CONVEYORIZED OVEN





Lanly experience embraces the designing of many such ovens for a large variety of purposes.

A letter or phone call will make our counsel available without obligation. Write for literature.

THE LANLY CO. 770 Prospect Ave. CLEVELAND, OHIO

WITH EACH PASSING YEAR STEVENS STRIVES TO SERVE BETTER THE METAL FINISHING INDUSTRY

For more than half a century, Frederic B. Stevens, Inc. has been devoted to serving the metal finishing industry with improved methods and materials for polishing, buffing and plating. Experienced metal finishers have found the benefits of doing business with Stevens are manifold. They have found Stevens job-qualified compositions give better polishing and buffing results at lower cost —Stevens research-proven methods assure the maximum efficiency in operations—and Stevens equipment reduces processing and labor expense. Let your nearby Stevens representative show you how you can "do it better for less." He will—without obligation—acquaint you with Stevens laboratory and technical services which are available to any metal finisher with a production problem. Call him today or write direct to Frederic B. Stevens, Inc., Detroit 16, Michigan, for full details.

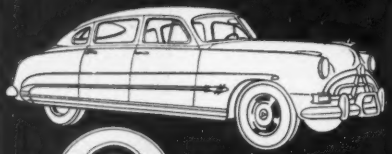
METAL FINISHING EQUIPMENT AND SUPPLIES SINCE 1883

FREDERIC B. **STEVENS** INCORPORATED

DETROIT 16, MICHIGAN

Hudson

LIKES LACQUER BEST BECAUSE...



. . . . lacquer brings out the desired "depth and transparency of colors" in Hudson Motor Car Company's 1951 models. For eye appeal and buy appeal, Hudson finds that lacquer is unmatched.

On the assembly line, Hudson prefers to work with lacquer. Fast-drying, it pays off with production speed and economy.

Lacquer helps Hudson owners, too. Lacquer is long lasting. Even after lengthy exposure to grime and weather, its original lustre is quickly and easily restored. Traffic scars can be quickly and economically touched up with lacquer.

HERCULES POWDER COMPANY
INCORPORATED
927 Market St., Wilmington, Delaware

HERCULES DOES NOT MANUFACTURE LACQUERS, ONLY THE DERIVATIVES FROM WHICH THEY ARE MADE

LACQUER
HELPS YOU SELL

CL50-20

tration obtained with 1 pound of nickel chloride. Do not add more than 3.0 ounces per gallon. If a higher chloride concentration is needed, make up the difference by using hydrochloric acid as outlined above. The commercial grade of magnesium chloride contains a relatively high proportion of calcium salts, making it undesirable for addition to plating baths.

We wish to emphasize that thorough drainage of work after plating and the installation of reclaim tanks will not only save nickel metal but will assist in preserving the proper chloride concentration in the bath. Under normal conditions, chlorides are not consumed in the plating operation but are lost almost entirely by drag-out of solution.

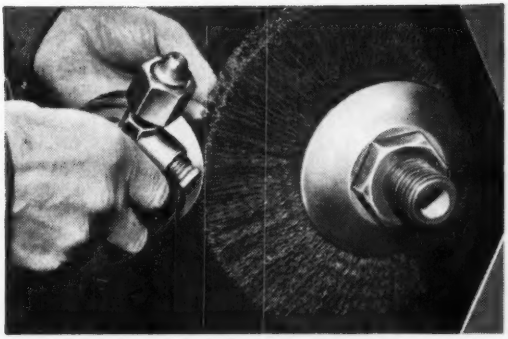
The suggestions given above will in most cases take care of chloride deficiencies. In extreme cases, nickel chloride can be produced in the bath by adding calculated quantities of hydrochloric acid directly to the solution and then operating a porous cup on the cathode rod until the pH has risen to the normal value. A 5 per cent solution of sulfuric acid and lead anodes should be used inside the cup. Further details regarding this method will be furnished upon request.
—Hanson-Van Winkle-Munning Co., Matawan, N. J.

Lightweight "curtain-walls" for large buildings may soon be made from porcelain enameled steel. Manufacturers of architectural porcelain enamel are working on the engineering problems involved in this important "sandwich" type of construction.

Handling of ready-mix concrete can be speeded up by the use of porcelain enamel chutes. The porcelain enamel also protects the chutes against corrosion and abrasion.

In the paper industry, where idler rollers are exposed to sulfuric acid, rollers which are porcelain enameled last six times as long as plain, uncoated rollers.

PITTSBURGH BRUSHES



OUTLAST COMPETITION 3 TO 1

says the Bastian Blessing Company,
Chicago manufacturer of soda fountains and equipment

At the Bastian Blessing Company ordinary power-driven brushes were used to satin finish brass parts and debur small threaded pieces.

Frequent breakdowns and changes forced the company to seek a superior brush. From a wide variety of makes, Bastian Blessing selected Pittsburgh brushes because *"these lasted three times as long as the nearest competitive brush tested,"* . . . were softer, more flexible, and lasted longer . . . gave a better finish.

After three years of use, the company reports: *"Increased production, improved quality and greater material savings."*

Let Pittsburgh brush engineers show you what they can do

Just tell us your special brush problems and our staff of skilled engineers will quickly, efficiently design and build power-driven brushes to meet your requirements precisely.

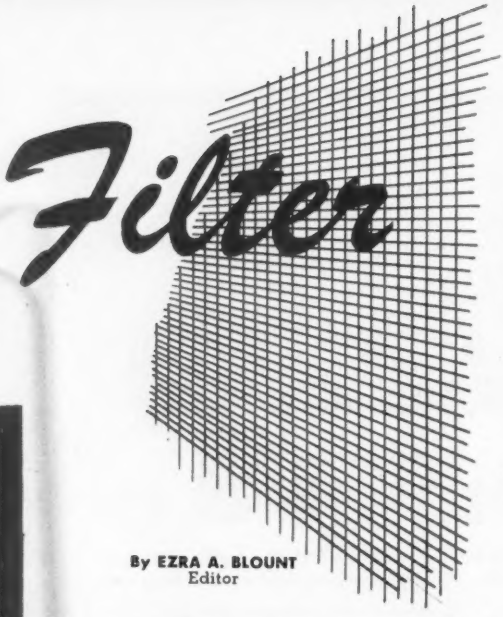
Or, you may find exactly what you are looking for in our regular Pittsburgh line . . . which includes sections, wheels and assemblies for every industrial use, whether it's glass, steel, or plastics . . . paper, tires, shoes or automobiles.

***For full information, write or phone* PITTSBURGH PLATE GLASS CO., *Brush Div.*, Dept. W-6, 3221 Frederick Avenue, Baltimore 29, Maryland.**

PITTSBURGH *Power Driven* BRUSHES

BRUSHES • PAINT • GLASS • CHEMICALS • PLASTICS

PITTSBURGH PLATE GLASS COMPANY



OUT YOUR PLATING REJECTS

By EZRA A. BLOUNT
Editor

Quality plating can be secured only from plating solutions free from suspended matter and dissolved impurities. Principles and procedures for plating solution clarification, namely the removal of objectionable contaminants either mechanically by filtration or by adsorption on activated carbon, are described in this article.

AS the electroplating industry has increased in size and importance, increasing stress has been placed upon the quality of plated ware. Not only must satisfactory electrodeposits be attractive, but they must also protect the metal upon which they are plated for a long period of time. Many factors have contributed to the accomplishment of these results. The part played in successful electroplating by cleanliness of the base metal has been stressed continually and is, of course, a major factor in the formation of a satisfactory electrodeposit. Increasing attention has been given to the treatment of water used to prepare plating solutions to eliminate unsatisfactory impurities from that source.

Since by the very nature of the process, impurities suspended or dissolved in electroplating solutions affect the electrodeposit in a variety of ways, it is equally as important to maintain plating solutions in a clear, clean condition as it is to devise fool-proof cleaning processes to be used in preparing the base metal for plating. Further, it is only sound operating practice to perform regular filtration and other solution maintenance operations, rather than experience an excessive amount of lost production time due to a shut down for emergency solution treatment.

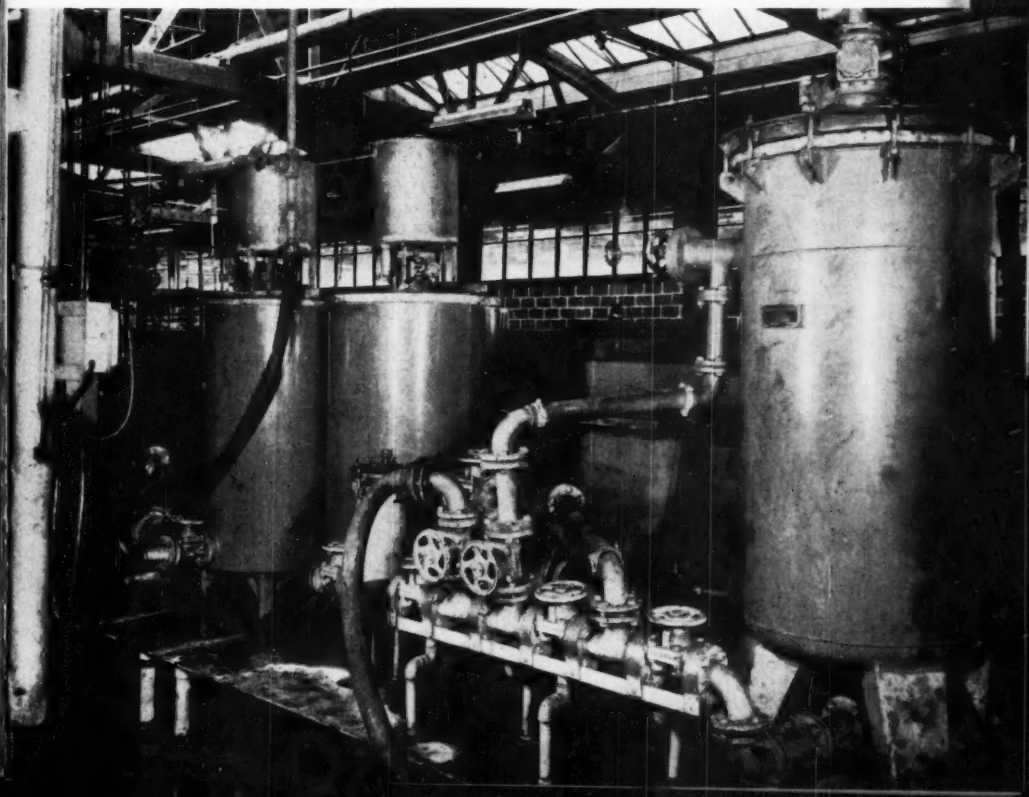
The effects of various impurities on electrodeposits have been covered in considerable detail in the literature.[1, 2, 3, 4, 5, 6] Suspended matter produces roughness in the deposit. Dissolved metal may codeposit with the metal being plated or influence the appearance of the deposit in other ways. Dissolved impurities of organic materials alter the appearance of the plate and change its properties. Illustrating graphically the value of a clean plating solution is the experience of at least one aircraft engine bearing manufacturer, who was able to deposit a bright silver plate on steel bearings from a silver solution containing no special brightening agents, but kept free from all impurities.

Suspended impurities can be satisfactorily removed by frequent or cont-continuous filtration.[7, 8, 18] Dissolved organic impurities may be removed by treating the solution with activated carbon, either added directly to the plating solution in a special mixing tank, or added to the filtration system as a filter cake on the filter frames.[7, 9, 10, 18] Dissolved inorganic impurities may be removed by chemical treatment methods of various kinds or by low current density plating.[11, 12, 13, 14] Electrolytic purification procedures (low current density plating) employed continuously in series with continuous filtration facilities have been widely adopted for large plating installations.[15, 16, 17] This article will deal with filtration procedures and activated carbon treatment used for plating solution maintenance on a periodic or continuous basis, since a great many objectionable impurities may be removed from plating solutions by these procedures.

Filtration

Filtration is a mechanical straining process in which the plating solution is processed through a membrane (woven textile cloth, wire screen, porous stone, porous metal, paper, or a deposited cake of solids) which permits the solution to pass but holds back suspended particles. The efficiency of filtration or the clarification obtained at the desired rate of flow depends upon

Fig. 1—Filtration equipment installed for filtering a 15,000-gallon bright nickel solution in a large job shop.
(Photo courtesy Industrial Filter & Pump Mfg. Co., Chicago 50, Ill.)



the selection of the proper membrane and the use of the proper filter aid to secure optimum results. Closely allied to this consideration is that of selecting a filter with adequate filter area for the desired rate of flow. Filtration rate is properly expressed as gallons per square foot per hour, whereas filter output is expressed as gallons per hour. Filtration rate, of course, takes into consideration the size of the filter and can thus be applied generally to various solutions. For electroplating solutions a filtration rate of between 25 and 50 gal./hour/sq. ft. of filter area has been recommended.

Plant operating conditions will determine the necessary frequency of filtration as well as the desirability of filtering continuously. It is difficult to predict in advance what conditions will be encountered in any particular shop except from the standpoint of results experienced in similar situations in other plants. Like the matter of desired frequency of solution turnover, the proper filtration rate and filter area (size of filtration equipment) are determined largely by the necessity of completely purifying the plating solution within a given time. A general statement may be made that for most plating solutions through which an appreciable quantity of work is being processed, continuous filtration is highly desirable if maximum operating efficiency and highest quality plating are to be obtained.

Fig. 2—A portable filter in use for continuous filtration of a plating bath. Filter paper acts as the mechanical straining device. (*Photo courtesy Alsop Engineering Corp., Milldale, Conn.*)

The question of how long a filter may be operated before it must be removed from the circuit and cleaned is determined by the solids capacity of the filter—a characteristic which should be included with other basic data applicable to the filter. The solids capacity of a filter is the total area of the filter elements multiplied by one-half the distance between adjacent filter elements.

In addition to being a determining factor in the amount of solids which can be removed from a solution in any one filtering cycle, the filter solids capacity is equally important when it is desired to use filter aid in connection with a filtering process. A diatomaceous material or other filter aid may be applied to the filter surface by precoating, or may be added (as a slurry) slowly as filtration progresses. A precoat of 2 ounces of filter aid per square foot of filter surface provides a coating $\frac{1}{16}$ inch thick and usually proves satisfactory. If, for example, the amount of filter aid selected has a higher cubic foot content than the solids capacity of the filter, then the filter will become clogged before it has been able to do any useful work. In general, 18 pounds of filter aid will occupy one cubic foot of space as filter cake. In the case of Darco (R) activat-

ed carbon used for coating filter frames either in addition to or instead of other filter aid materials, 25 pounds of the carbon will occupy one cubic foot of space as filter cake; for Nuchar (R) the figure is 15 pounds.

When it is necessary to clean the filter, the press must be opened and the filter cake and accumulated sludge removed by hand scraping or flushing with water. The material removed is, of course, of no further value. Some filters currently available are designed so that the cake can be removed by air or by hydraulic pressure and the resulting suspension flushed out of the filter without requiring partial disassembly of the filter press. Since the most desirable condition is that in which plating solution may be circulated through the filter at the fastest possible rate consistent with complete removal of undesirable impurities, operating conditions must be established insofar as possible to preserve the maximum filtration rate. Therefore, filters must sometimes be opened and cleaned, even though the cake space or solids capacity has not been entirely utilized, when the rate of flow has been reduced because of the deposition of certain solids. This condition, identified as premature fall in filtration rate, can be avoided by changing the rate of addition of filter aid or by regulating the pump pressure applied to the filtration surface.

The most common cause of premature drop in filtration rate is the presence of so-called compressible solids, such as the slimy gelatinous precipitates of nickel carbonate, ferric hydroxide, zinc sulfide, and zinc hydroxide, in the solution. (Filter aids and activated carbons are classed as noncompressible solids.) When a compressible solid reaches the filtration surface, it tends to spread out and form a film which is difficultly permeable to the flow of liquid through it. Increasing the pump pressure does not cause the situation to improve but rather makes it worse. Futher, unlike a reversible process, a reduction of pump pressure does not correct the condition. When filtering gelatinous precipitates, the addition of filter aid must be established at a rate which will produce the greatest filtration rate. Operating under such conditions, when the rate of flow diminishes due to the amount of filter cake in the filter or to the clogging effects of the gelatinous material, then the filter press must be removed from the line, cleaned, and re-coated.

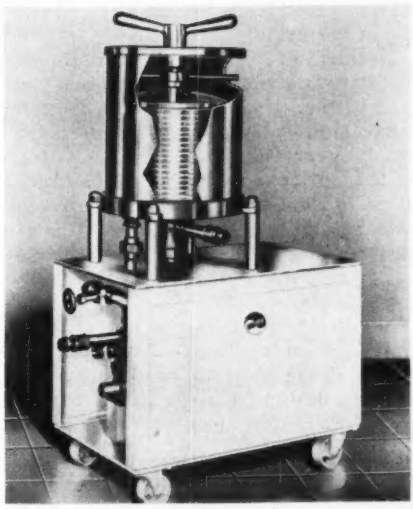


Fig. 3—The Ertel Model ECD stainless steel, cylinder type, disc filter features a double closure principle in that the filtering elements and cylinder are tightened independently. *(Photo courtesy Ertel Engineering Corp., Kingston, N. Y.)*

In connection with the proper filtration pressure, it should be pointed out that basic principles of filtration engineering specify that filter gage pressure at the start of the filtration cycle should be very little above zero and should rarely exceed 5 lb./sq. in. As filtration progresses, the pressure should rise only slowly and should

rarely exceed 35 lb./sq. in. gage at the end of the cycle.

Methods of controlling pressure on the filtration surface depend upon the type of pump being used. If a centrifugal pump is being used, the pressure can be controlled by valve throttling on the outlet side of the pump, since there is sufficient clearance between housing and impeller pump rotation at normal speed even with appreciable back pressure. If the pump is a positive displacement (gear or roller) type, direct throttling is not possible since the back pressure so developed would cause slowing or stoppage of the impeller and damage to the driving motor. Pressure control with such pumps is achieved through the use of a hydraulic shunt across the pump as indicated in Fig. 5. Thus, the pump operates at full displacement capacity but provides for the division of flow on the output side so that a portion of the effluent is continuously recirculated through the pump, and pressure in the main output line is never reduced. The pressure produced is controlled by the setting of the valve in the by-pass. Full displacement capacity of the pump imposes excessively high pressures on the filter at the beginning of the cycle. Hence, upon starting, the by-pass valve is set so as to reduce the gage pressure to 5 lb./sq. in. or less. As the filter rate slows down, due to the accumulation of solids on the filter surfaces, the by-pass valve can be closed gradually, increasing the pressure in the filter and maintaining a reasonably uniform flow rate.

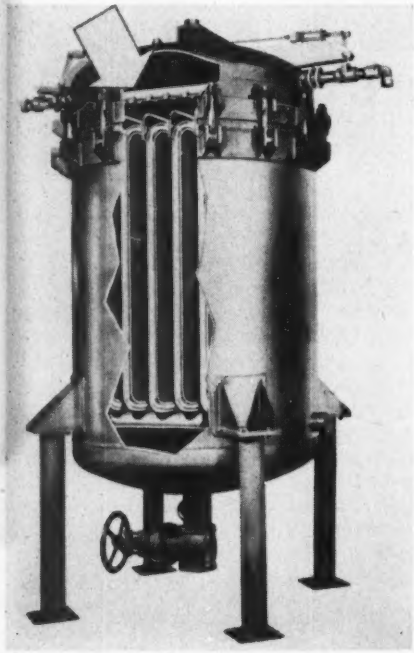


Fig. 4—The filter cake can be washed from each filter leaf in this Niagara "Auto-Sluice" Filter by high pressure spray nozzles fitted into the filter head (see arrow).
(Photo courtesy Niagara Filter Corp., Buffalo 14, N. Y.)

It is completely futile in handling compressible solids of the type illustrated by the examples mentioned above to attempt to secure a greater flow rate (when the rate of flow diminishes due to excessive pressure) by a further increase of pressure. Most operators have had the experience of removing a filter from the "line" and opening it for cleaning, only to find that no more than a thin film of slime was present on the filter elements.

An excellent "check list" outlining items in the filtration system which should be checked periodically as well as when trouble is encountered, has been prepared by Harold W. Faint, filtration development engineer, Industrial Filter & Pump Manufacturing Company, and published in the June 1950 issue of "Finish" magazine. Mr. Faint's check list is reproduced herewith:

SUCTION LINES

Suction line from slurry tank: (should be of sufficient volume for proper flotation of filter aids into the

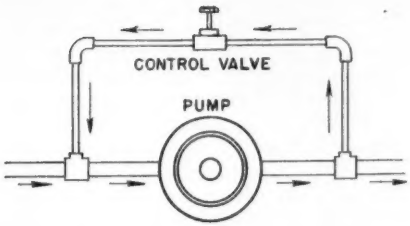


Fig. 5—Diagrammatic sketch showing means of pressure control as applied to operation with a positive displacement pump.

filter unit, from 50 to 100 per cent of the filter volume)

1. Is there valve control to start slurry into filter slowly?
2. Was the filter filled with clean water first to permit checking the system for leaks?
3. Are filter aids properly mixed and added to the slurry tank in proper amounts?

Suction line from pickling or neutralizer tanks:

1. Is suction hose strong-walled to withstand suction without collapse?
2. Is there a proper screen over suction hose to prevent small metal parts from entering the hose and later the pump, with resultant costly pump breakage?
3. Has the suction hose been so located in the tank to produce maximum circulation?
4. If suction line is piping, are there any leaks in flanges or threaded joints?

DISCHARGE

Discharge line to slurry tank:

1. Is there valve control to regulate flow?
2. Can operator readily check clarity?
3. Does return line reach below water level of slurry tank to prevent trapping a lot of air?

Discharge line to pickling or neutralizer tanks:

1. Does discharge end of hose give full benefit to tank circulation?
2. Is the hose secured to prevent "flopping" out of the tank with serious solution losses?
3. Is provision made for checking clarity of filtrate periodically?

VALVES

Gate and globe valves have packing in the stems that is subject to wear and replacement. Care in selection of

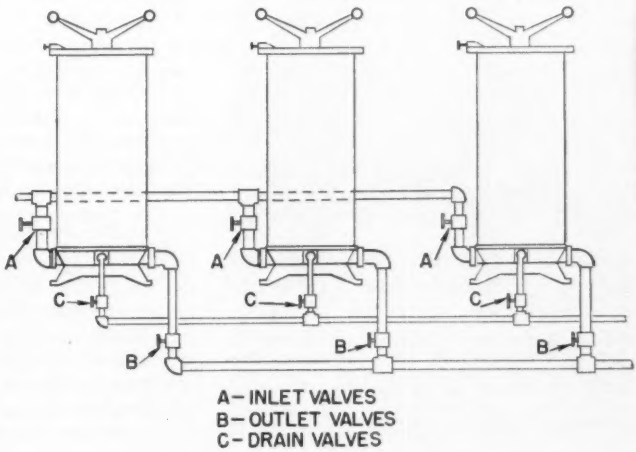


Fig. 6—For use with very large tanks a number of filters can be connected in parallel to provide the desired capacity. In the setup shown, designed by Alsop Engineering Corporation, any filter can be shut off, drained, and cleaned without interrupting operation of the others. *(Photo courtesy Alsop Engineering Corp., Milldale Conn.)*

new valves will prevent pipe fitters from slipping bronze seated valves into cyanide solutions. Rubber lined, rubber diaphragm valves require periodic inspection and every filter operator should know how to disassemble these valves to check the moving parts in the bonnet for proper functioning.

Hose clamps are absolutely necessary for all hose connections.

FILTER UNIT

The filter unit should be assembled according to the manufacturer's instructions. Haste in the assembly of the unit is the worst possible waste of time. Every type of filter unit is designed for a specific method of assembly in order to get the best results from the unit.

PUMP

The pump (usually centrifugal type) is the "heart" of a filtration system. If it fails to "beat" properly, there is no filtration. First test the freeness of rotation of the pump shaft (by hand and before starting the motor). This is necessary with the concentrated baths used today, for after the pump has been shut down for a while, salts may crystallize in the stuffing box and a sudden start may rip the packing, or score the shaft. Investigation shows that the majority of troubles with centrifugal pumps result from faulty conditions on the suction side, or mechanical trouble. A check list for pump operation follows:

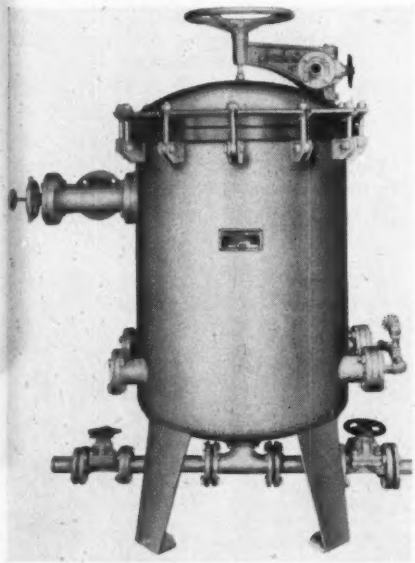


Fig. 7—A view of the filter unit only of an Industrial standard 3,300 g.p.h. nickel solution filter. Filter may be cleaned without removing cover by means of an Air-Wash Cleaning Method.
(Photo courtesy Industrial Filter & Pump Mfg. Co., Chicago 50, Ill.)

NO SOLUTION DELIVERED

1. Priming casing and suction pipe not completely filled with liquid.
2. Speed too low.
3. Discharge head too high—check vertical head (particularly friction loss).
4. Suction lift too high (suction pipe may be too small, or long, causing excessive friction loss). Handling cold water, total lift including friction loss in suction pipe should not exceed 15 feet, or never more than 2/3 total head.
5. Impeller or suction pipe or opening completely plugged.
6. Wrong direction of rotation.
7. Air pocket in suction line.
8. Stuffing box packing worn.
9. Air leak in suction line.

NOT ENOUGH SOLUTION DELIVERED

1. Priming casing and suction pipe not completely filled with liquid.
2. Discharge head higher than anticipated—check friction loss.
3. Suction lift too high (suction pipe may be too small or long, causing excessive friction loss). Handling cold water, total lift including friction loss in suction pipe should not exceed 15 feet nor in any case be more than 2/3 total head.
4. Impeller or suction pipe or opening partially plugged.

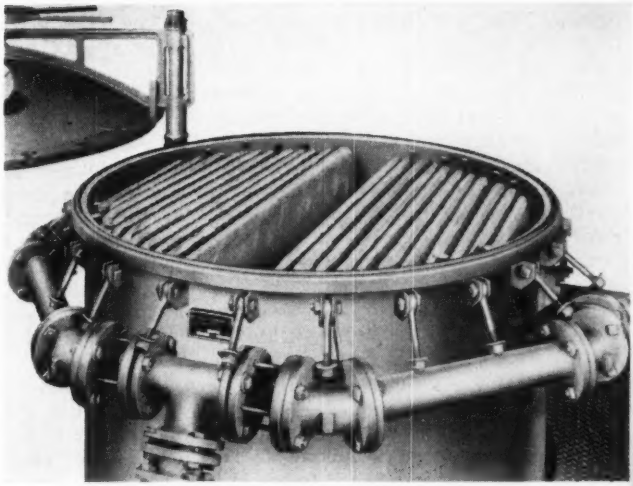


Fig. 8—Top view of an Industrial 15,000 g.p.h. filter with cover open, showing the coating of the filter aid on the filter leaves. The piping around the front of the filter shows the two sight glasses that are put in the line so that the two banks of filter leaves may be compared as to the degree of clarity of the solution being filtered through each bank.
(Photo courtesy Industrial Filter & Pump Mfg. Co., Chicago 50, Ill.)

5. Wrong direction of rotation.
6. Air pocket in suction line.
7. Stuffing box packing worn; leakage of air into pump casing.
8. Air leak in suction line.
9. Foot valve not immersed deep enough.

NOT ENOUGH PRESSURE

1. Speed too low.
2. Air in water.
3. Mechanical defects: impeller damaged or worn.
4. Wrong direction of rotation.

PUMP WORKS FOR A WHILE—THEN QUITS

1. Leaky suction line.
2. Mechanical defects: shaft bent; rotating parts bind, are loose or broken; bearing worn out; pump and driving unit misaligned.

Removal of Dissolved Organic Impurities by Adsorption on Activated Carbon

Dissolved impurities of an organic nature affect the quality of the resulting electrodeposits in various ways. Impurities of this nature tend to become adsorbed on freshly cleaned work immersed in the bath. The better the cleaning job performed on the base metal, the better the surface presented for the adsorption of organic impurities. The resulting adsorbed film on the work prevents perfect adhesion of the deposit. After carbon treating such a solution, one improvement noted immediately is that better adherence of electrodeposit is obtained. Another way in which dissolved impurities interfere with quality plating is by codeposition of the dissolved organic matter with the microcrystals of the metal being plated. Such a deposit is, of course, defective in ductility and brightness.

The use of carbon in the treatment of plating solutions goes back to the 19th century when silver solutions were treated with charcoal (not activated carbon) to secure improved silver deposits. What is believed to be the first case of plating solution treatment with activated carbon for purposes of purifying the solution and improving the quality of the deposit occurred in 1931 at the Apollo Metal Works, Chicago, Illinois. Mr. Frank P. Romanoff, the plating supervisor, treated an ordinary nickel plating so-

lution with activated carbon and found that the nickel deposit which was being applied to steel sheets was greatly improved in ductility, adherence, and freedom from an objectionable porous structure, so that the plated sheets could be subjected to stamping, bending, and forming stresses without damaging the deposit.

At the Milwaukee Convention of the American Electroplaters' Society held in 1938 the possibility of controlling the new bright nickel solutions through the use of activated carbon was discussed. At subsequent A. E. S. Conventions, principally 1941, papers on clarification of plating solutions by filtration as well as removal of dissolved organic impurities through the use of activated carbon were presented.[1, 7, 11, 12]

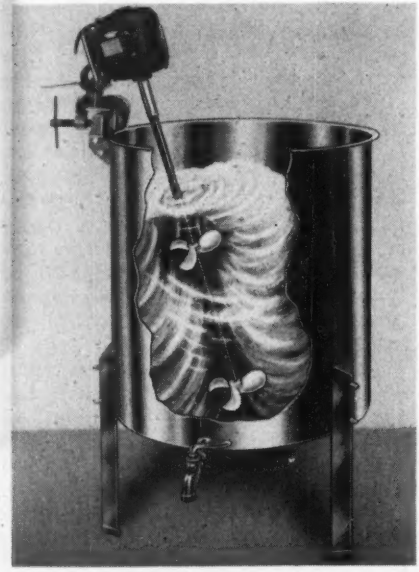


Fig. 9—"Hy-Speed" portable electric mixer mounted on mixing tank. A setup such as this may be employed to prepare a slurry of filter aid (and/or activated carbon) to be drawn into the filter circuit at a uniform rate. (*Photo courtsey Alsop Engineering Corp., Milldale, Conn.*)

The introduction of bright nickel solutions with all their accompanying advantages sparked the use of activated carbon to purify such solutions and make possible the continuous production of high quality nickel deposits. This method of treatment became quite widespread for the removal of harmful impurities; such impurities were most prevalent in earlier baths than in the later bright nickel solutions because the organic addition agents added as brighteners tended to decompose and form harmful solution ingredients.

Since activated carbon proved so successful in the treatment of bright nickel solutions, its use was extended to other plating solutions until today there is hardly a plating solution in operation in which activated carbon treatment has not been found helpful. As examples, the following solutions may be cited: cyanide copper, silver, nickel and bright nickel, gold, palladium, rhodium, platinum, iron electroforming solutions, acid copper, acid zinc, acid tin, pyrophosphate copper, cyanide zinc, cyanide cadmium, and indium. An exception should be cited in the case of chromium on which activated carbon acts as a reducing agent and forms trivalent chromium, an undesirable solution constituent. There is no reason why activated carbon should even be considered as a possibility for improving the operation of chromium plating solutions, since such solutions are so strong in chromic acid, an oxidizing agent, that any organic impurity present would be immediately oxidized by the chromic acid. To repeat, activated carbon treatment should not be used on chromium plating solutions.

The impurities to be removed from plating solutions by treatment with activated carbon accumulate from many sources. Chiefly, the impurities are organic but occasionally an inorganic impurity in colloidal form is

present either alone or associated with an organic residue. As has been cited, some impurities form as decomposition products of addition agents. Others accumulate as a result of the introduction of buffing compound or other organic materials into the solution through over-hasty or inefficient cleaning. Sizing from anode bags is another source of organic impurities, and in some cases products leached from rubber tank linings, although tank lining material developments have greatly reduced or entirely eliminated difficulties from that source. So-called tramp impurities can be introduced through carelessness or accident, such as oil and grease from bearings or paint dropping into the tank from the ceiling, to mention two common conditions. Such impurities may float as a film or may become emulsified by the wetting agent in the solution and thus be distributed throughout the entire solution.

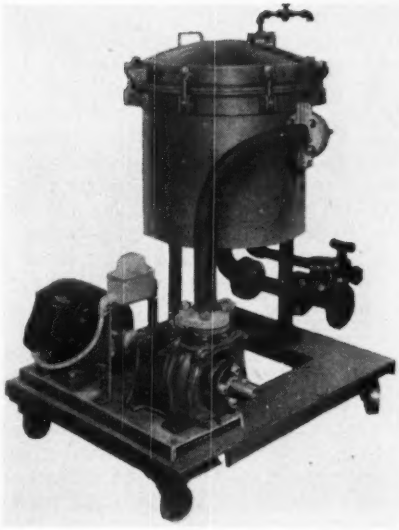


Fig. 10—A portable, 800 g.p.h., rubber-lined steel filter designed for use with bright nickel, acid copper, and acid zinc plating solutions. (*Photo courtesy Sparkler Manufacturing Co., Mundelein, Ill.*)

Examples of Plating Solution Improvement Through Activated Carbon Treatment

In the bright nickel plating of parts for household appliances prior to chromium plating, brightness of deposit, as well as ductility and adherence, is of paramount importance. In one case cited, although the loss of brightness was not too evident, difficulty developed in securing the desired degree of ductility and adherence of the bright nickel to the steel base metal. After the original desired characteristics of the deposit had been restored by activated carbon treatment, it was found that the reason for the difficulty was insufficient cleaning, so that organic impurities were being carried into the plating solution.

Many processes of bonding rubber to steel involve the deposition of a brass electrodeposit on the steel prior to the rubber bonding operation. In one case, the brass plating solution was not performing properly, with the result that the rubber bonded products were not satisfactory. Treatment with activated carbon corrected the difficulty for a brief period, after which trouble was again experienced. After several such treatments, the operator decided to transfer the entire solution to another tank and prepare a fresh plating bath. Upon pumping out the offending solution, the plater found a cake of yellow laundry soap in the bottom of the tank—an extreme example of a "tramp" impurity.

Upon occasions the source of an organic impurity is very difficult to determine. One plant was plating acid zinc continuously on steel wire, and experienced poor adherence, rough plate, and dark splotchy areas on the deposit. As in the previous example, activated carbon treatment corrected the trouble only temporarily. A thor-

ough and complete inspection of the entire process revealed no original source of contamination. During the course of the investigation, however, it was noted that the 10,000 gallon plating solution operated at 110 deg. F., required a sizeable replacement of water lost by evaporation each day (300 to 500 gal.) Upon tracing the source of this water, it was found to be untreated lake water taken from a point in the lake at which there was industrial pollution of an organic nature. The problem continued to baffle the experts when test solutions made up of treated water did not correct the unsatisfactory plating conditions. The influence of operating pH upon the removal of the organic impurities was then realized, and after the water had been adjusted to the operating pH of the plating bath (pH 3.5) and then treated, satisfactory results were obtained. The particular organic impurity in question was not adsorbed by the activated carbon at the pH of the lake water but was removed at the operating range of the zinc plating bath. It can be added parenthetically that the best pH for adsorption is that at which the organic material in question is least soluble. If difficulty is encountered in removing an impurity through the use of activated carbon, then the possibility of varying the pH within the limits established by the characteristics of the plating bath should be explored.

Instructions for preparing many bright nickel solutions in current use today include treatment with activated carbon, since it can usually be safely assumed that some impurities will be present in the salts used to prepare the solution. Not only is activated carbon treatment used in preparing a new solution, but it can also be used for removing the excess hydrogen peroxide or potassium permanganate remaining in a nickel solution after treatment with those chemicals for removal of undesirable impurities. Activated carbon is an excellent catalyst for the decomposition of hydrogen peroxide. With potassium permanganate activated carbon forms carbon dioxide and converts the manganese to a hydroxide.

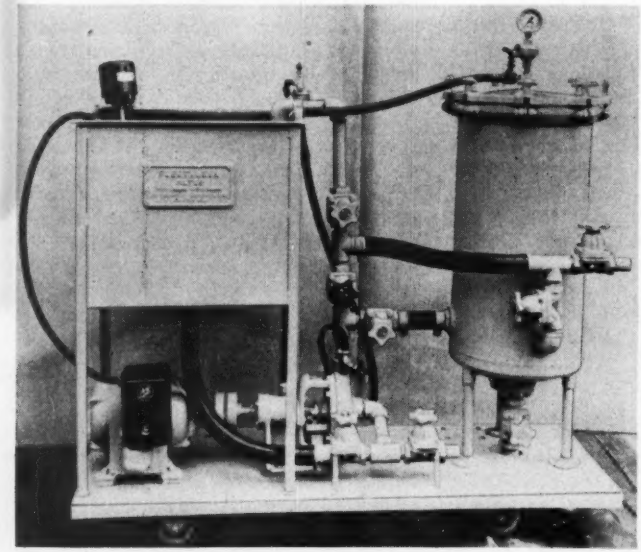


Fig. 11—The Model SA-9CR Fleetkleen Filter contains a rigid, inert, porous stone retaining membrane, and is rated at 1,500 g.p.h. for acid solutions. Features include a built-in precoat tank, and a self-cleaning system. *(Photo courtesy Co-Operative Industries, Inc., Chester, N. J.)*

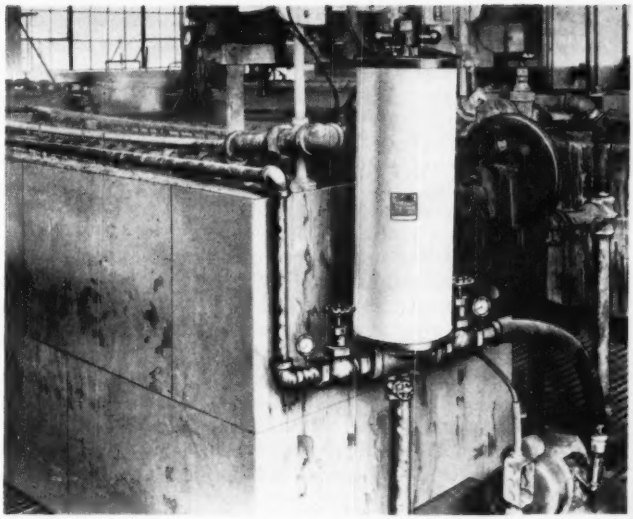


Fig. 12—Fulflo 12-tube filter in use in a small plating plant. (*Photo courtesy Commercial Filters Corp., Boston 27, Mass.*)

●

Activated Carbon Treatment Details

The amount of activated carbon required in the treatment of various plating solutions varies from a few ounces to four or five pounds per 100 gallons, depending upon the contamination to be removed. Smaller dosages are, of course, required where carbon treatment is used in connection with continuous filtration, so that excessive loss of organic addition agents necessary to the proper operation of the plating solution in question may be avoided. In such a situation the activated carbon establishes an equilibrium with one organic material but will still adsorb another organic impurity which may be harmful to the operation of the plating bath. If the plating solution has been operated until the concentration of the contaminating organic material is very high, then between two and four pounds of activated carbon per 100 gallons must be used to purify the solution. Such a concentration of carbon will completely remove all organic materials from the solution, so that desired organic addition agents will have to be replaced after the completion of the carbon treatment.

To minimize down time for reasons of solution maintenance, it is, of course, desirable to operate a plating process so as to avoid such emergency measures. This can be accomplished by intermittent treatment at more or less regular intervals to remove impurities which accumulate at a known rate as indicated by bath performance. Such intervals may vary from a few days to two months, depending upon shop experience.

To treat a solution with activated carbon for the complete removal of organic impurities by the intermittent method as opposed to the continuous filtration method, pump the plating solution into an auxiliary tank (never put activated carbon directly into a plating tank). Add to the solution in the auxiliary tank the correct amount of activated carbon as indicated by experience or recommendations of a plating service engineer, and stir the mixture for 30 minutes or more. In the meantime the plating tank should be thoroughly cleaned and prepared for the return of the carbon treated and filtered solution. If the filter to be used for the purpose has the necessary solids capacity, it is a preferred procedure to continue stirring the plating solution during filtration rather than

to allow the activated carbon to settle and filter only the clear liquid. This recommendation is made because powdered activated carbon is manufactured under careful control as to particle size and particle size distribution to give maximum filtration rate and clarity of solution. The particle size distribution is completely upset by partial settling or sedimentation.

When filtration of the stirred mixture of plating solution and activated carbon is begun, the filtrate should be recirculated to the treatment tank until perfectly clear filtrate is obtained. To aid in determining when this point has been reached, it is desirable to take a small sample of the filtrate and filter it through white filter paper in a laboratory so that any traces of carbon present can be clearly seen as black specks against the white background of the filter paper.

As good filtration practice dictates, in returning filtered solution to the plating tank, the return line should be made to extend to the bottom of the plating tank to avoid excessive splashing and aeration which may make the plating solution unusable for a period of as much as 24 hours, or until such time as the dissolved gases have time to escape. The presence of a wetting agent creates an additional hazard in the form of a foam blanket if the solution is returned to the plating tank so that it may splash and entrap air.

As an alternative to intermittent treatment as described above, the precoat method may be used. In this method of treatment the activated carbon is applied as a precoat to elements of a filter press, and the solution to be treated is pumped through this coating in the process of filtration. Such a precoat is applied over a preliminary precoat of filter aid until the desired amount of activated carbon has been added to the filter. A recommended technique in connection with precoating consists of preparing a slurry of filter aid in water or in a small quantity of the plating solution, after which the filter pump may be started and the cake formed. The volume of the slurry in question should be sufficient to fill the pump, filter and auxiliary pipe lines with excess liquid so that the pump will not suck air. Further, the solids content of the slurry should not exceed 1.25 pounds per gallon. To deposit the precoat, a line from the suction side of the pump is put into the slurry tank as well as a line from the filter discharge. The pump is then started and the contents of the slurry tank circulated continuously through the filter. Precoating is, of course, complete when all solids in the slurry have been transferred to the filter frame and the solution is clear. It is desirable to perform this operation as close to the plating tank as possible so that when precoating is complete, the discharge line from the filter can be put into one cor-

RANDOLPH
LACQUERS, ENAMELS
DOPES, THINNERS
Clear Metal Finishes
Clear S.G. For Metal
Colored Lacquers
Texture Enamels
Aircraft Finishes
Specialized Production Finishes
PRODUCTS
RANDOLPH PRODUCTS Co.
CARLSTADT, NEW JERSEY

ROBINSON'S *Assayed* GOLD PLATING SOLUTIONS and SALTS

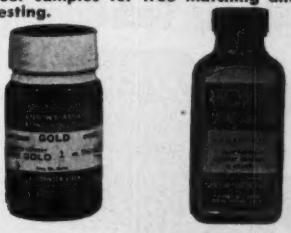
PALLADIUM · RHODIUM

for SPECIFICATION PLATING

WHERE CLOSE TOLERANCES ARE DEMANDED

Ideal for Government Contract Work in the field of Electronics, Scientific and Optical Instruments and all Industrial and Decorative uses.

Robinson's complete line of Assayed Precious Metals are available to industry and the jewelry trade, in all quantities—by Troy or Avoirdupois with metal content guaranteed. Karat and Alloy Golds, both liquid and salt, come in all degrees of hardness—and in all shades. For a hard, white, durable finish, specify Palladium or Johnson-Matthey Rhodium. Send on your samples for free matching and testing.



A. ROBINSON & SON

"70 Years in Precious Metals"

131 CANAL STREET NEW YORK 2, N. Y.

CAnal 6-0310—0464

A. ROBINSON & SON, 131 Canal St., N. Y.
Please send information on Robinson's Assayed Gold Plating Solutions ☐, Potassium Gold Cyanide ☐, Rhodium Solutions ☐, Booklet: "Precious Metal Plating" ☐.

Name..... Street.....

City..... State.....

ner of the plating tank and the suction side of the pump put into the diagonally opposite corner. When the down time of the pump in this operation is held to a minimum, sloughing off of the precoat due to the temporary pressure drop can usually be avoided.

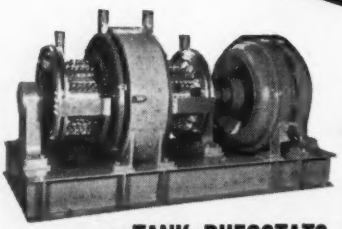
With the ouput of the filter previously determined, it is a simple matter to calculate how long the filter should be operated to obtain one complete pass of the plating solution through the filter containing the activated carbon coating. Some operators prefer to allow the filter to run long enough to secure two or three passes of the solution so as to ensure complete purification. The precoat method of using activated carbon provides excellent contact between the carbon and the plating solution but permits only a very short contact time, and hence should not be used if the plating solution is heavily contaminated. Ordinary amounts of impurities are removed if the contact time is one second or less. Additional time is required for diffusion of the impurity into the pores of the activated carbon after contact. Where it is possible, an ideal way of using carbon is by the continuous filtration method since this method provides protection against anticipated sources of contamination, as well as random or tramp impurities which may be introduced into the solution unexpectedly at any time. The principal drawback to the wide use of continuous treatment is that many necessary organic addition agents would be adsorbed, and would have to be replaced continually to provide for the continuous production of a satisfactory electrodeposit. If a wetting agent is the only organic addition agent used, then the problem is not too serious because activated carbon will reach an equilibrium with respect to the wetting agent, and the necessary amount of excess wetting agent can

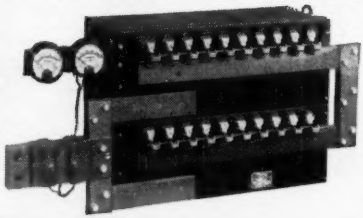
COLUMBIA

MOTOR GENERATORS

for

Electroplating, Anodizing
Electrocleaning, Electropolishing





• TANK RHEOSTATS
• REVERSING SWITCHES
• TONG TEST AMMETERS

Write for Descriptive Bulletins

COLUMBIA ELECTRIC MFG. CO.

4535 HAMILTON AVE. • CLEVELAND 14, OHIO

Start Clean...
Stay Clean!

A Must for Plater as Well as Photographer

The photographer would be foolish to risk his prize shots in developing solutions that are not quite pure.

It is just as bad to risk wasting time, labor and the expense of cleaning metal for plating by putting the work into a plating bath that may not stay pure. *Start* clean . . . *stay* clean with Red Label Darco S-51!

Red Label Darco adsorbs plating-bath impurities to *its* surfaces before they can be deposited on the freshly clean work. It is especially treated for use in plating — *every batch is laboratory tested to meet the benzol-mercury test!* Red Label Darco S-51 is easy to handle . . . easy to wet . . . easy to incorporate into a slurry.

Is your plating bath as clean as the water in your final rinse?

Practically all leading suppliers carry Darco in stock — place an order for Red Label Darco S-51 *today* — and don't accept substitutes!

DARCO DEPARTMENT
ATLAS POWDER COMPANY
Darco General Sales Offices
60 East 42nd Street, New York 17, N. Y.

be added to the solution with the result that the desired surface tension level can be maintained. In the case of many brighteners, it is impossible to use little enough carbon or add enough brightener to replace that removed. Hence, continuous treatment cannot be employed. Where continuous filtration is imperative, as in the case of a bath very sensitive to organic impurities, then there must be continuous addition of brightener to replace that adsorbed by the activated carbon.

Types of Carbon for Various Conditions

Powdered carbon having a fineness of 75 per cent past a 325-mesh screen (for example, Red Label Darco (R) S-51) is the best compromise between maximum accessibility to the internal porous surface of carbon particles and maximum filterability. Such carbons should be washed with acid and water during the process of manufacture for the removal of inorganic materials which might contaminate the solution to be purified. Particularly, the activated carbon should be sulfide free, since experience has shown that sulfides are harmful to plating solutions. When solutions to be treated are alkaline (pH 10 or over) and are operated above 150 deg. F., the carbons used should be very low in silica (for example, Darco (R) G-60) because of the tendency to form soluble silicates, which in turn would affect plating solution operation adversely by causing anode polarization. Anode slimes so formed, or formed by other unsatisfactory conditions, prevent good electrical contact between the anode and the solution. Likewise in such solutions, filter aids of diatomaceous earth should be avoided since they are almost all pure silica. If a filter aid is necessary, such materials as Solka-Floc, alpha cellulose, or Filterbestos may be employed. Cellulose filter aids, however, cannot be used in an ammoniacal copper bath since that solution is a good solvent for cellulose.

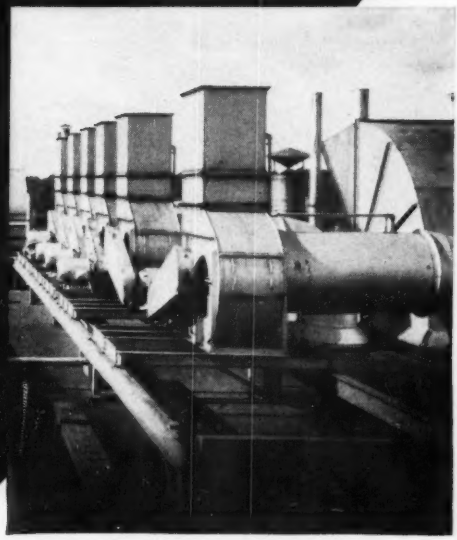
In the case of the acid copper solution, organic impurities result in a hard, brittle deposit. However, complete removal of the organic matter makes possible an excessively soft copper. If such a bath is treated with activated carbon, it is desirable to add phenol sulfonic acid or some other recommended addition agent. Since hardness is an important characteristic of acid copper deposits, as in the case of electrotypes, that factor must be considered when treating electrotyping solutions with activated carbon.

In addition to the fine activated carbon in general use, a special granular carbon sized to pass through a 4-mesh screen, yet be retained on a 12-mesh screen, is manufactured for use in Fulflo filters. Such a setup has the advantage of high filtration rates such as are particularly desirable for small plating tanks.

I THRIVE ON DUST, LINT AND SAND PARTICLES
Improved
DETROIT "HANDY TAC" RAG
NON INFLAMMABLE
Standard of the FINISHING INDUSTRY for 16 years.
DETROIT "HANDY TAC" RAG
DETRO MFG. & SALES CO., INC., CULVER CITY, CALIF.

For Better Working Conditions in Paint Spray Departments

Be Sure - specify "Buffalo" FANS ON YOUR EXHAUST SYSTEMS



"BUFFALO" INDUSTRIAL EXHAUSTERS
("MW" for Material Handling,
"AW" for more efficient Air Handling.)

• DEPENDABLE — "Buffalo" Fans have earned this reputation in every industry in exhaust systems.

• EFFICIENT—a complete range of centrifugal and axial flow fans, a satisfactory fan for *your* particular installation.

• LOWER COST IN THE LONG RUN!—"Buffalo" Fans are long-lasting and simple to service — saving on both power and maintenance.

First For Fans

• *WRITE FOR FACTS!*

BUFFALO "FORGE" COMPANY

536 BROADWAY BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Branch Offices in All Principal Cities

VENTILATING AIR WASHING AIR TEMPERING INDUCED DRAFT EXHAUSTING
FORCED DRAFT COOLING HEATING PRESSURE BLOWING

ACKNOWLEDGMENT

The author acknowledges gratefully the collaboration of W. A. Helbig, Darco Department, Atlas Powder Co., New York, N. Y., in the preparation of this article.

LITERATURE REFERENCES

1. Effect of Impurities in Plating Solutions, Dr. Walter R. Meyer, "Proceedings of American Electroplaters' Society," June 1941, p. 65.
2. Effect of Impurities and Purification of Electroplating Solutions, D. T. Ewing, "Proceedings of American Electroplaters' Society," June 1946, p. 209.
3. Some Effects of Copper in Nickel Plating Solutions, D. T. Ewing and William D. Gordon, "Proceedings of American Electroplaters' Society," June 1947, p. 213.
4. Effect of Impurities and Purification of Electroplating Solutions. Some Effects of Copper in Nickel Plating Solutions on the Salt Spray Resistance of Nickel and Nickel-Chromium Deposits on Steel, D. T. Ewing, Robert Rominsky, and William King, "Proceedings of American Electroplaters' Society," June 1948, p. 119.
5. Effect of Impurities and Purification of Electroplating Solutions, D. T. Ewing, Robert Rominsky, and William King, "A.E.S. Research Report, Serial No. 13, 1949."
6. Effect of Impurities and Purification of Elctroplating Solutions, D. T. Ewing and William D. Gordon, "A.E.S. Research Report, Serial No. 15, 1950."
7. Physical Removal of Impurities from Plating Solutions, W. A. Helbig, "Proceedings of American Electroplaters' Society," June 1941, p. 68.
8. Filtration for Nickel and Neutralizer Solutions, "Harold W. Faint, "Finish," June 1950, p. 25.
9. Activated Carbon Purification of Plating Solutions, Dr. Allen G. Gray, Finishing Clinic, "Products Finishing," October 1947, p. 80.
10. Continuous Carbon Treatment of Plating Solutions May Contribute to Quality Plating, Dr. Allen G. Gray, Finishing Clinic, "Products Finishing" November 1948, p. 86.
11. Chemical and Electrochemical Methods for the Purification of Plating Solutions, O. A. Stocker, "Proceedings of American Electroplaters' Society," June 1941, p. 76.
12. The Removal of Chromium Contamination from Alkaline Plating Solutions, Dr. M. M. Beckwith, "Proceedings of American Eletroplaters' Society," June 1941, p. 80.
13. Electrolytic Methods for Purification of Nickel Plating Baths, Dr. Allen G. Gray, Finishing Clinic, "Products Finishing," December 1947, p. 60.
14. Purification of Plating Solutions, Dr. Allen G. Gray, Spotlighting Finishing Progress, "Products Finishing," September 1949, p. 62.
15. Streamlined Bumper Production, Ezra A. Blount, "Products Finishing," October 1948, p. 20.
16. Production Plating of Die Cast Automotive Trim, Ezra A. Blount, "Products Finishing," July 1949, p. 14.
17. Diaphragm Tanks Promote Plating Progress, Ezra A. Blount, "Products Finishing," July 1950, p. 12.
18. Filtering Practice for Plating Solutions, K. L. Carr, "Finish," May 1950, p. 29.

FELT DOES IT BETTER

Paramount Brand

FELT WHEELS

Superior for Polishing and Buffing

When you order FELT WHEELS specify PARAMOUNT BRAND FELT WHEELS for top quality and uniformity.

BACON FELT CO. WINCHESTER, MASS.

Established 1824

"America's Oldest Felt Manufacturer"

Send for our Complete Catalog

HERE'S A QUICK, LOW-COST SOLUTION

CHROMALOX *Electric* HEAT

Economical CHROMALOX Electric Heaters can be installed anywhere to provide efficient "on the spot" heat at accurately maintained temperatures in all types of applications. They may be used to heat gases and liquids; to heat dies, molds and platens, to melt soft metals and for hundreds of other uses. 15,000 types, sizes and ratings are available for almost any need! Nationwide engineering assistance is yours without obligation.

Get Your Copy of
CHROMALOX CATALOG 50

It shows many of the standard 15,000 types, sizes, ratings of Chromalox Electric Heaters. Write today.

EDWIN L. WIEGAND CO., 7552 THOMAS BOULEVARD, PITTSBURGH 8, PA.

CHROMALOX IB-94-B

ELECTRIC HEAT FOR MODERN INDUSTRY

Quick Answers TO YOUR

In this new, modern research laboratory, your finishing questions and spray equipment problems are put to actual test for positive and conclusive solutions.

FINISHING PROBLEMS...

DeVILBISS SERVICE

in your plant and in our research lab

Ask the DeVilbiss man when you're stumped by a finishing problem . . . he's a factory trained technician on all phases of spray-finishing, backed up by DeVilbiss engineers and the extensive new DeVilbiss Research facilities in Toledo. His job is solving your problems. You can rely on him for factual recommendations whether the solution lies in a simple adjustment of existing equipment or the complete replacement of all facilities. And wherever you're located, a DeVilbiss man is close by.

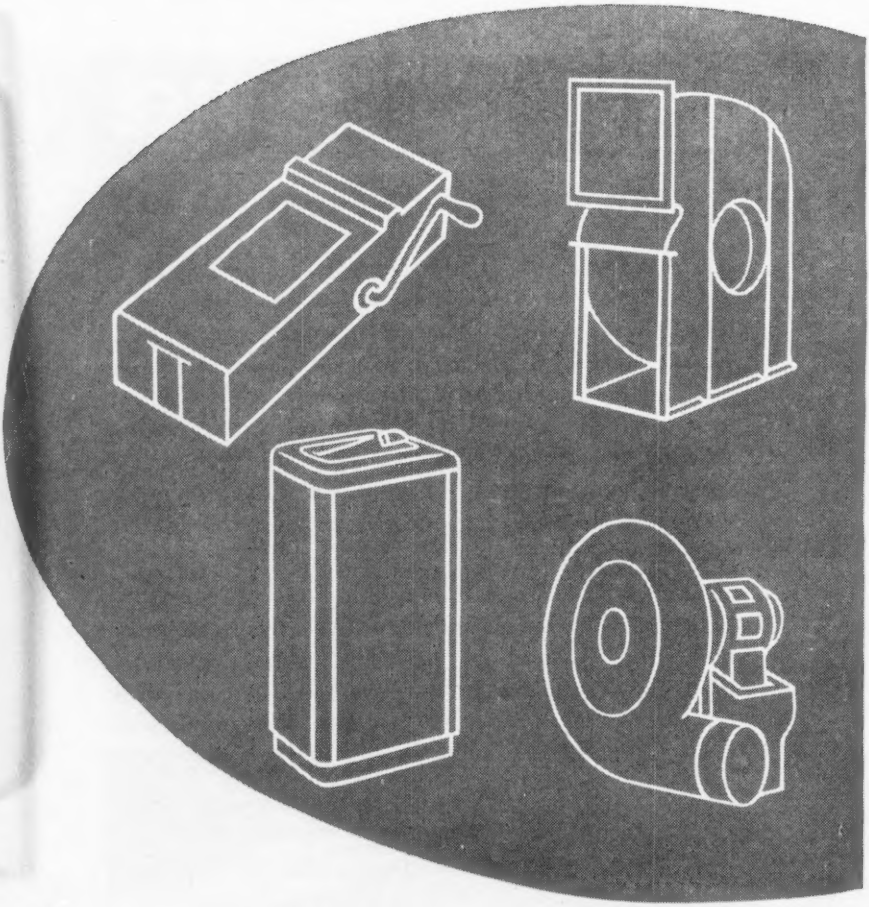
If you visit Toledo, or drive through on U. S. Route 24 or 25, you'll pass our big new Research Laboratory and plant. Come in and see what we make and how up-to-the-minute research works hand in hand with 62 years of experience to give you best answers to finishing problems.

THE DeVILBISS COMPANY
WINDSOR, ONT. • **TOLEDO 1, OHIO** • LONDON, ENGLAND
SANTA CLARA, CALIFORNIA
Sales Offices in 22 leading cities

DE VILBISS *means* **Quality** *in all four . .*

SPRAY EQUIPMENT
EXHAUST SYSTEMS
AIR COMPRESSORS
HOSE & CONNECTIONS

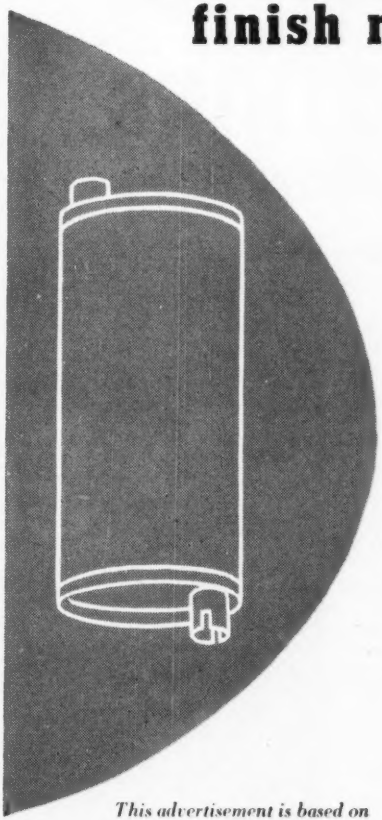
LOWE BROTHERS



✻ Finish used here was Metalustre Enamel. Manufacturers of many other sheet metal products, such as compressors, air conditioners, water coolers, registers and exhaust fans, are using Metalustre Enamel to brighten their product and keep finishing costs low. Remember, the unsurpassed quality of Lowe Brothers Industrial Finishes means unsurpassed *finishing results.*

"FINISHING SPECIALIST"

lowers manufacturer's finish needs 75% per day!



This advertisement is based on facts from the Lowe Brothers Industrial Case History Files.

"Price competition" was the major problem of this auto muffler manufacturer. When analyzing the company's finishing operation, a Lowe Brothers "Finishing Specialist" found that the method employed was responsible for unnecessary loss of material through "over-spray." He recommended better spraying methods and suggested a finish* that could take greater reduction, thus reducing material costs. These recommendations resulted in the manufacturer's needing only 10 gallons of finish per day for the same number of mufflers that had previously taken 40 gallons per day—with a corresponding savings in labor cost.

This case—where the recommendations resulted in a manufacturer's using 75% *less* finish—provides a perfect example of the way Lowe Brothers "Finishing Specialists" are serving manufacturers everywhere. You, too, may benefit by the knowledge and experience of a "Finishing Specialist." His service costs you nothing. Have him analyze *your operation* now. Write today for details.

THE LOWE BROTHERS COMPANY • DAYTON 2, OHIO

Spotlighting FINISHING Progress

Reactions of Resins with Drying Oils Have an Important Effect on Finishes

AT the Drying Oil Symposium, presented as a part of the 1949 Fall meeting of the American Chemical Society by the Division of Paint, Varnish and Plastic Chemistry, P. O. Powers, Battelle Memorial Institute, in discussing reactions of resins with drying oils, brought out the fact that the full benefit of resins in finishes is often not achieved unless there is at least some degree of chemical reaction between the resin and oil, thus achieving a much more homogeneous vehicle. If chemical reaction does not occur, the only effect of the resin is the dilution of the oil, and, in such cases, beneficial effects may be obtained such as improvement of the water resistance of the resulting finish. The most useful resins are those which undergo chemical combinations with the drying oils.

It was pointed out that while the idea that a reaction does occur is widely accepted, the type of the reaction is not always fully understood. In most cases, the extent of this reaction has not been measured in quantitative terms because such measurements can be made only with great difficulty. One exception to this case is the group of alkyd resin finishes, in which case the type of reaction is understood, and generally, the extent of the combination of the polyester structure with the drying oils is quite accurately controlled.

By DR. ALLEN G. GRAY

A Monthly Digest of Current Technical Progress Indicating Significant Trends and Developments in the Finishing Industry

IS THERE A S-L-O-W D-O-W-N GOING ON IN YOUR PLANT?

YOU CAN STOP IT—STEP UP PRODUCTION
REDUCE MATERIAL HANDLING COSTS WITH

JENSEN

LOOP AROUND • STRAIGHT LINE
DUAL STRAND • BELT • SPECIAL

CONVEYORS

EQUIPPED WITH VARIABLE SPEED DRIVES

There is one type of industrial slow down you can and should guard against . . . the slow down caused by the impractical use of expensive manpower for material handling operations. Today, in the face of keen competition you need the savings available to you through modern material handling equipment and methods. $2.00 is too much to spend for labor to accomplish a 20c job!

Whether your conveying needs call for wire mesh, loop-around, straight-line, stainless steel, canvas or rubberized belting makes no difference—*Jensen makes them all.* Installations are skillfully designed and engineered to coordinate with production operations permitting continuous processing of work while in transit. Thus, material handling costs are kept at "rock bottom."

As a pioneer in electrical radiant heating equipment Jensen specializes in fully coordinated finishing systems, incorporating planned conveying. Write today for descriptive literature. Better yet, call in a Jensen representative to look over your operation and submit recommendations.

Jensen SPECIALTIES INCORPORATED
• Representatives in Principal Cities
9331 FREELAND AVENUE • DETROIT 28, MICHIGAN

MANUFACTURERS OF *ECONOMY-ENGINEERED* RADIANT HEAT EQUIPMENT
"DUAL HEAT" INFRARED OVENS • CONVEYORS • PAINT DIP TANKS

In the drying oils there are two parts of the molecule which are readily susceptible to chemical reaction. The ester group can readily enter into acid interchange, alcohol interchange, and ester interchange. This type of reaction occurs frequently and is exceedingly important, particularly with the acid and ester type resins. The fatty acids in the glycerine structure can readily be replaced by resin acids, natural rosin acids, and a wide variety of synthetic acids. The glycerol in the ester structure also can be replaced by other polyhydric alcohols and by synthetic resins containing hydroxyl groups. Esters of resin acids readily interchange with the fatty acids in the drying oil structure.

On the other hand, it was brought out that the unsaturated groups are not so readily combined with resinous materials. According to Powers, this type of addition is sometimes postulated where there is no definite proof of such combination. Recently, there has been considerable activity in the formation of addition products of hydrocarbon resins with the drying oils, effected by polymerization in the presence of the drying oil. In this case, it is apparent that desirable results are obtained principally when some measure of combination of the hydrocarbon resin and the drying oil is achieved.

In the case of reaction with the ester group, Powers pointed out the long known fact that rosin, when added to tung oil, retards gelation of the oil. If enough rosin is used, gelation is prevented. This effect is not due to dilution of the oil alone, since neutral diluents do not thus prolong the gelation; the effect of the rosin is to enter the glycerine structure of the oil and reduce the potential amount of cross-linking.

With reference to alcohol interchange, the ester group in the drying

Get LIQUID ENVELOPE PEELABLE

SPRAY-BOOTH COATING

from these outstanding distributors:

General Spray Equipment Co., Boston, Mass. • Bay State Equipment Co., Springfield, Mass. • Lea Manufacturing Co., Waterbury, Conn. • Edgcomb Steel of New England, Milford, Conn. • Kellerman Paint Co., New York, N. Y. • Grapek Paint Co., Newark, N. J. • Pennsylvania Lacquer Center, Philadelphia, Pa. • R. W Renton Co., Cleveland, Ohio, Indianapolis, Ind. • Dean & Barry Co., Columbus, Ohio • Vic Miner Co., Toledo, Ohio • Abrasive & Supply Co., Detroit, Mich. • Melson Industrial Supply Corp , Grand Rapids, Mich. • O'Donohue Sales Co., Milwaukee, Wis. • Paints & Lacquers Inc., Chicago, Ill. • Tanner & Co., Indianapolis, Ind. • Metal Goods Corp., St. Louis, Mo., North Kansas City, Mo., Dallas, Texas,New Orleans, La. • Hubbard & Stau, Los Angeles, Calif. • M. E. Smith Co., Los Angeles, Calif. • C & H Supply Co., Seattle, Wash • Hugh Russel & Sons Ltd., Montreal & Toronto, Canada.

BETTER FINISHES AND COATINGS, INC.

268 Doremus Ave., Newark 5, N. J. • 122 East 7th St., Los Angeles 14, Calif.

FOR HIGH PRODUCTION POLISHING and BUFFING

ACME Automatic

POLISHING and BUFFING MACHINES

ACME "Specials"

MEET THE DEMANDS OF MANY SPECIAL JOBS ...

1—ACME Grill Polishing Machine, six foot planer type table with rocking motion. Two floating heads are used.

2—ACME Type S.M. delivers production from 2000 to 7000 per hour on flat or oval head screws, rivets, lock barrel facings, small escutcheons and similar small parts.

3—ACME Grinding Machine for chamfering both ends of clutch springs. A highly productive machine of the S.M. type.

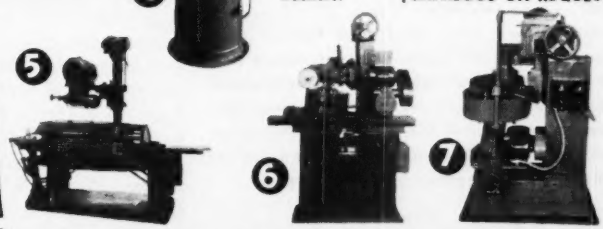
4—ACME Special Jigger type machine with 8 station index table and 3 disc type air driven grinding heads.

5—ACME eight station Trunnion Indexing Machine, air indexed. Buffing head is mounted on six foot slide and strokes over work.

6—ACME Square, Hexagonal and Octagonal Tube machine with ACME Type G-3 floating head lathe with special fixture arrangement for polishing out milled slots in aircraft supercharger.

7—ACME Special S.M. Type machine for grinding flat side of conical or radius washers. *(CATALOGS ON REQUEST)*

ROTARY STRAIGHT LINE SEMI-AUTOMATIC AND SPECIAL *Polishing and Buffing Machinery*

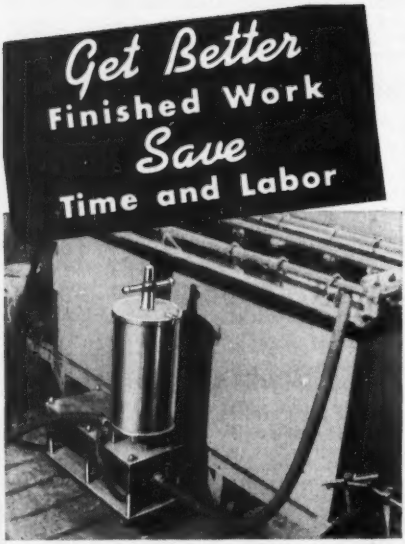


SPECIAL MACHINERY AUTOMATIC BUFFING MACHINES

ACME Manufacturing Co.

1645 HOWARD ST. DETROIT 16, MICH.

Builders



With a "Sealed-Disc" Filter

You'll get better finished plated work, save time and labor and you'll get longer service life from your plating solutions. More and more cost-minded platers depend on Alsop *"Sealed-Disc"* Filters, to remove all dirt, dust and oil-sludge from their solutions and keep their solutions free from even the invisible impurities that cause trouble. Users of *"Sealed-Disc"* Filters save time and labor, they know that their clean work is being put into bright, clean solutions. Regardless of the size or type of your installation, there's a *"Sealed-Disc"* Filter to *"fit your job"*—write for complete information or contact your regular plating supplier.

Write to:

ALSOP ENGINEERING CORPORATION
512 Keen Street, Milldale, Conn.

ALSOP ENGINEERING CORPORATION
Filters, Filter Discs, Mixers, Pumps, Tanks

oil molecule can be replaced with alcohols just as the acid group can be replaced by a variety of acids. This principle is employed in the alcoholysis step in the formation of alkyd resins. Glycerol is largely employed here in commercial practice, although pentaerythritol and other polyhydric alcohols have been used. Also, the formation of polyhydric alcohol esters of the drying oil acids has resulted in the formation of synthetic drying oils with improved properties.

The introduction of synthetic resins having no alcoholic groups has been used to reinforce drying oils. It was pointed out that by using high temperatures, ethyl cellulose does form esters by alcohol interchange with the drying oils. Another fact brought out in this connection is that recently a synthetic resin containing a portion of hydroxyl groups has been made available. This material, according to Powers, is a polyvinyl chloride having about 6 per cent of the segments as vinyl alcohol. The presence of these groups considerably alters the solubility of the resin as compared to polyvinyl chloride-acetate. Also, this resin can be dispersed in the drying oils, and this dispersion is accompanied by esterfication of some of the hydroxyl groups in the molecule.

In the case of ester interchange, this type of reaction occurs in most cases, when an ester resin is heated with a drying oil. It has been suggested, on many occasions, that the speed of heat bodying is greatly increased by the presence of varnish resins, and it is known that the time to reach a certain viscosity may be greatly reduced by the addition of certain resins. However, it was brought out by Powers that the increased speed of bodying is not necessarily an index of the reactivity of the resin with the oil. There are also reactions that may take place with the double bond in the drying oil.

Specification Chemicals for the Government and its Contractors

Phosphatizing, Rust Proofing and Paint Bonding Chemicals

SPECIFICATION NUMBER	ACP SPECIFICATION CHEMICAL
QQ-P-416	"Lithoform," "Zinodine"
RR-C-82	"Lithoform" No. 32
MIL-C-5541 (See also QPL-5541-1)	"Alodine"
MIL-S-5002	"Alodine," "Granodine" (Dip, Spray and Brush grades)
JAN-C-490, Grade I	"Granodine" (Dip, Spray and Brush grades)
JAN-F-495	"Granodine" (Dip, Spray and Brush grades), "Lithoform"
JAN-L-548	"Permadine"
AN-E-19	"Alodine," "Zinodine"
AN-F-20	"Alodine," "Granodine" (Dip, Spray and Brush grades), "Lithoform," "Permadine," "Thermoil-Granodine," "Zinodine," (See also U.S.A. 3-213)
U.S.A. 57-0-2	
Type II, Class A	"Thermoil-Granodine"
Type II, Class B	"Permadine"
Type II, Class C	"Granodine" (Dip, Spray and Brush grades)
U.S.A. 51-70-1	
Finish 22.02, Class A	"Thermoil-Granodine"
Finish 22.02, Class B	"Permadine"
Finish 22.02, Class C	"Granodine" (Dip, Spray and Brush grades)
U.S.A. 50-60-1	"Granodine" (Dip, Spray and Brush grades)
U.S. Navord O.S.675	"Alodine"
U.S.N. Appendix 6	"Lithoform"
Navy Aeronautical M-364	"Permadine," "Thermoil-Granodine"
AN-C-170	(See MIL-C-5541)
U.S.A. 72-53	(See AN-F-20)
AXS-1245	(See JAN-C-490)

Rust Removing and Metal Conditioning Chemicals

SPECIFICATION NUMBER	ACP SPECIFICATION CHEMICAL
JAN-C-490, Grade II	
Type 4	"Deoxidine" Nos. 126, 512, 526, 624, 670
Type 5	"Deoxidine" Nos. 170, 171, 670
U.S.A. 3-213	
Type I	"Deoxidine" (Wash-off grades)
Type II	"Deoxidine" (Wipe-off grades)

Metal Cleaning Chemicals

SPECIFICATION NUMBER	ACP SPECIFICATION CHEMICAL
JAN-C-490, Grade II	
Type 2	"Ridoline"
Type 6	"Ridosol"
U.S.A. 3-192	"Ridoline" No. 3192
U.S.N. Appendix 6	"Deoxidine"

Acid Inhibitors, Pickling

SPECIFICATION NUMBER	ACP SPECIFICATION CHEMICAL
U.S.N. 51-1-2	"Rodine"

Write us for descriptive folders and further information on the specification chemicals listed above. Additional copies of this chart are available on request.

Pioneering Research and Development Since 1914

AMERICAN CHEMICAL PAINT COMPANY

AMBLER, PA.

Manufacturers of METALLURGICAL, AGRICULTURAL and PHARMACEUTICAL CHEMICALS

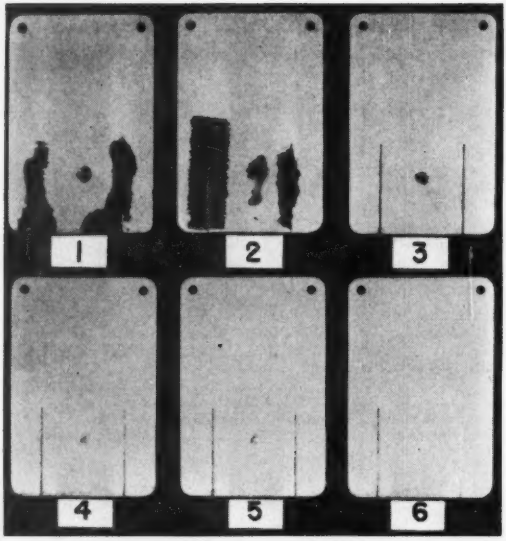


Fig. 1—Test panels used to study the protective value of tin undercoatings on painted steel, in work done at the Tin Research Institute. The coatings were damaged, subjected to corrosion by salt spray and then all the loosened paint was removed.

1—bare steel
2—0.0005 inch electro-zinc
3—phosphated
4—0.0005 inch electro-tin
5—0.0001 inch electro-tin
6—0.0005 inch electro-tin

(Photo courtesy Tin Research Institute)

Tin Plate As Undercoat for Paint

LABORATORY tests using exposure to natural or accelerated weathering which were recently carried out at the Tin Research Institute (England), have demonstrated promising effects of thin coatings of electrodeposited tin under paint in delaying rusting of steel. The tests were conducted in accordance with that prescribed by Provisional British Standard 1391: 1947, "Performance test for protective schemes embracing stoving paints for the protection of light gauge steel and wrought iron against corrosion." In this test, panels with the paint coatings damaged in standard manner by two scratches and a dent produced by a falling weight were subjected to a spray of artificial sea water. A tin-coating 0.00005 inch thick satisfies Schedule I of the test, which covers phosphate coatings. Thicker coatings will give better performance.

Figure 1 illustrates the conditions of the panels after exposure to the prescribed performance tests at the Tin Research Institute Laboratories. The test panels were subjected to vigorous treatment to remove loosened paint. In doing this the right-hand half of each panel, including half the indentation, was scrubbed with steel wool. To the scratch on the left-hand side a strip of cellulose adhesive tape was applied and then removed by a snatch pull. The excellent resistance to the loosening of paint provided by the phosphate and the tin coatings is well demonstrated in the vicinity of the scratch. The good adhesion of the paint to the tinned panels at the indentation, even after the consecutive treatments of impact, corrosion, and rubbing with steel wool, according to the laboratory report, provides a further demonstration of the ability of the combination of paint and electrodeposited tin to stand up to rough handling in use.

Figure 2 shows a group of motorcycle sidecar frames which have been tinned by electrodeposition prior to painting. An additional advantage, according to the Tin Research Institute, which has been gained by the factory using this process, is the ability

Announcing

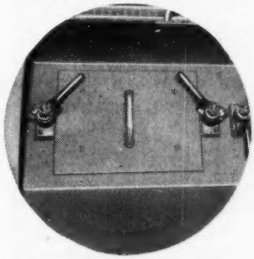
GRAV-I-FLO PROCESS

and equipment for tumbling

5'8" x 5'4" x 5'8" ht. Two 24" x 40" I.D. compartments, ½" plate unlined or ¼" plate rubber lined. Reduced voltage control on magnetic starter. Lever or push-button switch. Limit switch on safety guard. 220-440 volt motor with brake.

Water attachment with hose. Variable speed drive, timer controls optional.

MODEL 48-2



Cam locks on doors have manually released safety stops.

GRAV-I-FLO is an improved process for tumbling metal parts, employing newly developed materials and specially designed equipment to produce desired finishes faster and in larger volume. Grav-i-Flo Super-Brite finishing chips cut 25% faster on non-ferrous metals, and eliminate subsequent operations such as ball burnishing. Grav-i-Flo compounds change chip surface from finishing to cutting in minutes. Grav-i-Flo natural and synthetic chips are obtainable for all de-burring of various alloys. Check with Grav-i-Flo on machinery, accessories, grinding chips; and grinding, finishing and burnishing compounds.

Samples Processed Free! Grav-i-Flo will tell you how to attain a better finish at lower costs. Send samples to distributors or direct to:

THE GRAV-I-FLO CORPORATION
Dept. PF-12, 400 Norwood Ave. • Sturgis, Mich.

Distributors:
Crown Rheostat and Supply Co., 3465 N. Kimball St., Chicago 18, Illinois.
W. M. Fotheringham, 977 Niagara St., Buffalo 13, N. Y.
Sommers Brothers Mfg. Co., 3439 No. Broadway, St. Louis.
A. J. Lynch and Co., 2424 Enterprise St., Los Angeles 21.
R. W. Renton and Co., 877 Addison Road, Cleveland, O.
Enthone, Inc., 442 Elm St., New Haven, Connecticut.
Fotheringham Platers Supplies, Ltd., 200 Bedford Rd., Toronto, Ont., Can.

GRAV-I-FLO **TUMBLING**

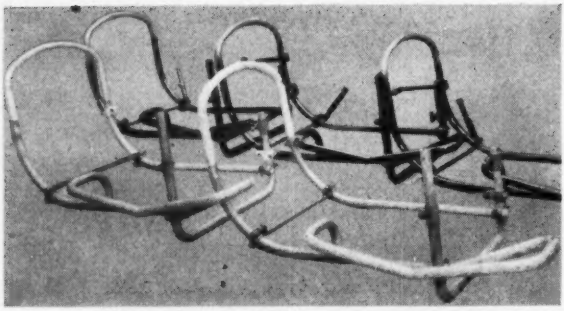


Fig. 2—A group of electrotinned motorcycle sidecar frames awaiting painting and assembly.
(Photo courtesy Tin Research Institute)

to store such material for long periods between manufacture and the final processes of assembly and painting without sacrifice of surface condition.

* * *

Rhodium Plating Provides a Non-Tarnishing Finish

RHODIUM is finding wide use in the plating field for many finishing applications. The deposit is brilliant, white and hard, and the solution has excellent throwing power. The major application of electrodeposited rhodium has been in coating of objects where a non-tarnishing finish of moderate cost is required. This finish is widely used for jewelry of all descriptions—watch cases, watch movements, razors, spectacle frames, electrical contacts, and parts on electronic equipment. Sterling silver and silver plate can be protected from tarnishing, which is of particular importance where lacquering is not permissible. The qualities peculiar to rhodium make it a splendid metal for reflectors of every kind. This is particularly true where they have to stand up under the high temperature of arc lights. While silver and aluminum have a higher reflectivity than rhodium, this metal is not subject to tarnish or corrosion. A rhodium plated reflector is always bright and requires no lacquering to preserve its surface. Its higher reflectivity in the blue and ultraviolet range of the spectrum as compared with silver may be utilized on reflectors for therapeutic or photographic equipment.

Successful baths for the electrodeposition of highly reflective and decorative coatings of rhodium are based upon the use of a soluble rhodium phosphate complex, and with additional quantities of either phosphoric acid or sulfuric acid, as desired. The characteristics of the two types of baths do not differ greatly and both are reported to yield bright deposits, the reflectivity in the visible range being about 75 per cent. The bath formulas below were recently given by E. M. Wise, International Nickel Company, in "The Journal of the Electrochemical Society" as being the most widely used for commercial rhodium plating.

RHODIUM BATH FOR THIN BRIGHT PLATES

Rhodium, as complex phosphate 2 g./l.
Sulfuric acid ---------- 20 cc./l.

Operate at 40-50 deg. C. and a cathode current density of 50 amp./sq. ft. Current efficiency will range from 5-12 per cent.

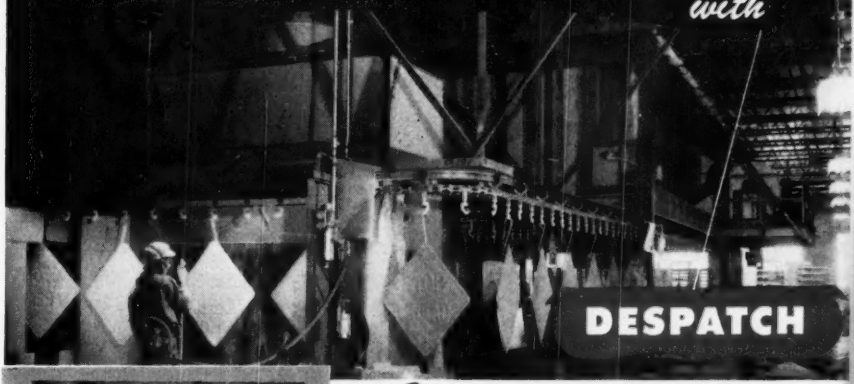
RHODIUM BATH FOR HEAVIER PLATES

Rhodium, as sulfate ---------- 4 g./l.
Sulfuric acid ---------- 20 cc./l.

Operate at 45 deg. C. with lead anodes and a cathode current density of 10-15 amp./sq. foot.

Baths of other types are known,

METAL SIGN PRODUCTION IN THIS PLANT HAS INCREASED 25% with DESPATCH



Natural heat seals are achieved by oven's bottom entrance and exit.

Conveyorized — FINISHING SYSTEM

Producing heavy metal street and highway signs at Lyle Sign Company, Minneapolis, is big business. Durability plus long-lasting legibility are among the top requirements.

To further improve quality and step up production, Lyle Signs recently installed this modern DESPATCH Finishing System with 350 ft. continuous, monorail conveyor and overhead oven.

100 24" x 24" SIGNS PER HOUR

This system is now producing 100 24" x 24" signs per hour, per coat of paint. The oven is a 4-pass, direct gas fired. Its overhead construction allows for bottom entry and exit of the conveyor line, which provides natural heat seals. Much of the floor area under the oven is used for loading and unloading the conveyor and sign racks, thus saving floor space. The route of the conveyor under the oven serves as a cooling area.

Signs are spray painted in a DESPATCH water wash spray booth. From two to three coats of enamel are applied, each being subjected to a 30-minute baking at 300° F.

NO MATTER WHAT THE PRODUCT—

DESPATCH Finishing Systems are designed to finish it better and faster.

They are engineered to fit your particular needs. You can get a complete system or individual units, such as—

- BAKING OVENS
- DRYOFF OVENS
- SPRAY BOOTHS
- FLOW COATERS
- WASHERS
- AIRMAKEUP SYSTEMS
- CONVEYORS

DESPATCH OVEN COMPANY

WRITE TODAY for Bulletin 51C or request a representative to call.

Minneapolis Offices: 619 S. E. 8th Street

Chicago Offices: 7070 No. Clark Street

such as the straight sulfate and one based on the chloride, but the last is not suitable for the normal appearance applications of rhodium, although it is effective in depositing heavy layers of rhodium on noble metal surfaces.

Based on recommendations of Baker & Co., a supplier of commercial rhodium plating solutions, a phosphoric acid type electrolyte is usually preferred for the plating of white metal (tin) rhinestone jewelry. According to the above supplier, guessing at the amount of rhodium in a plating bath is not the best practice. This is because the best results are obtained by keeping the rhodium content as close as possible to 2 g./l. (7.57 g./gal.). The Baker Rhodium Comparator is based on a colorimetric method for rapidly determining the rhodium content of a plating bath. The frequent addition of small quantities of rhodium to the bath will produce consistently good performance over a long period of time and will keep the electrolyte in best condition for instant use. The rhodium content preferably should be kept at 2.0 g./l.; it is reported that the plating becomes less uniform when the rhodium content is allowed to drop below 1.7 g./liter.

FORM-A-ROC
FIRST-COAT
FOUNDATION
FOR FINE FINISH

1. Dries with lacquer speed.
2. Has double lacquer solids at spray gun.
3. Fills very well—sands easily.
4. Adheres tenaciously to steel, wood, presdwood, aluminum, galvanized metal, etc.
5. Holds out lacquer, synthetic or oleoresinous enamels exceptionally well.
6. Thins 3:1 with xylol.
7. Available in GREY, SALMON and OFF-WHITE.
8. Ground well to smooth texture.

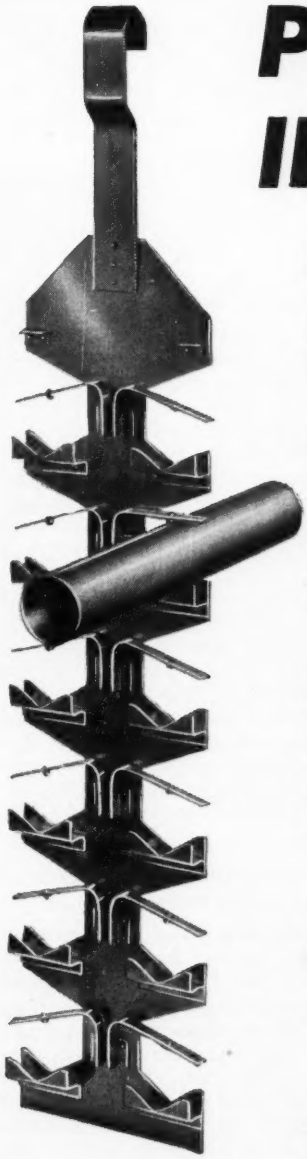
MADE BY
The Varnish Products Company
5208 Harvard Avenue Cleveland, Ohio

* * *

Finishing Beryllium Copper Parts

INDICATIONS are that beryllium copper alloys are finding increased use in a wide range of industrial applications. As a part of a comprehensive discussion of beryllium copper alloys in "Materials & Methods" (Manual 58—Apr. 1950), John T. Richards, The Beryllium Corp., brought out the fact that beryllium copper products can be readily cleaned, polished, or buffed in a manner similar to other copper alloys. Procedures are also available for plating and coloring beryllium copper.

Burrs resulting from press work can be removed from small parts by barrel tumbling. Sand blasting provides a clean uniform surface and is frequently used with castings where a dull finish is acceptable. Vapor degreasing or alkaline cleaning may be used for the removal of oil, grease or dirt. Sometimes, for appearance reasons, or for such operations as soldering, brazing, welding, or plating it is necessary to remove the oxide film which forms on beryllium copper parts by pickling. To ensure effective results, it is essential that oil, grease, and other lubricants be removed prior to pickling. For pickling, a 20 to 30 per cent by volume solution of sulfuric acid (conc.) is recommended, at a temperature of 160-180 deg. F., for a sufficient period of time to completely loosen the dark scale. This operation should be followed by a nitric acid dip to remove all traces of black scale as well as any



PLASTISOL INSULATION

Racks **Fixtures**

Electro Plating **Jigs** **Anodizing Fixtures**

NEW materials and manufacturing processes make BUNATOL No. 1002 the preferred insulation for racks and fixtures for use in electro plating, anodizing and hard Chrome. Low cost with exceptional long insulation life will keep down rack expense.

BUNATOL No. 1002 is a 100% solids plastisol with exceptional toughness for wear resistance, and chemical resistance to withstand all plating and anodizing solutions. The high gloss surface gives complete and fast rinsing without carry over. Important too is that a *single* Primer coat is used—which also saves time, labor and cost.

No. 1002 is also very effective as a coating for jigs and fixtures for assembling. The tough resilient coating stops scratching and marring of the work. Simple to apply and lasts indefinitely. Not affected by oils, grease and chemicals, and remains soft and springy.

Just a note on your letterhead will bring complete information and samples.

NELSON J. QUINN CO., • TOLEDO 7, OHIO

red stains that may be present. The solution recommended consists of 30 per cent by volume nitric acid (conc.) in water. The dip is used at room temperature and the immersion time should be limited to a period that will prevent etching of the base metal. Thorough washing in cold water and a following hot rinse are necessary to remove all traces of acid before drying to avoid the undesirable acid stains. An acid neutralizing dip in a soap solution is sometimes used between the final cold and hot water rinses. In addition to the final washing, parts being treated must be thoroughly rinsed in cold water between successive acid treatments.

It was reported that beryllium copper components can be plated with any of the commonly plated metals including cadmium, zinc, tin, copper, chromium, nickel, silver, rhodium and gold. Tin, zinc and cadmium coatings can be used to compensate for differences in electrochemical potential at bimetallic junctions. Cadmium plate is frequently used as a die lubricant. A tin coating is of advantage for soft soldering since it permits the use of non-corrosive rosin fluxes. Beryllium copper parts can also be tinned by hot dipping using a chloride flux. Where special electrical characteristics, including high-frequency conductance or low contact resistance are necessary, it has been found desirable to plate with such noble metals as silver, gold, or rhodium. Of these metals, it is reported that silver is the most widely used. However, gold is employed for low resistance and very light pressures while rhodium deposits offer unusual combinations of corrosion and wear resistance, hardness, reflectivity, and low and stable contact resistance. Processes are also available for coloring beryllium copper parts.

* * *

Protective Coating for Molybdenum

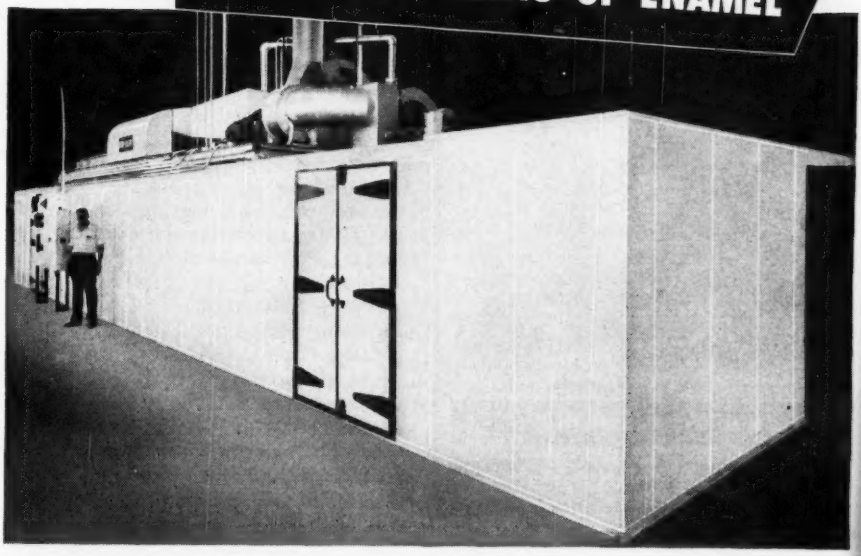
WORK conducted at Battelle Memorial Institute in cooperation with the Fansteel Metallurgical Corporation has shown that molybdenum can be rendered highly corrosion resistant by treatment with a hydrogen-silicon tetrachloride atmosphere at 1000 to 1800 deg. C. so as to produce a molybdenum disilicide coating at its surface. According to the report presented before the Electrochemical Society, coatings 1 mil thick thus produced have completely protected the base metal for over 4000 hours in air at 1000 deg. C. and for over 30 hours at 1700 deg. C. Thicker coatings, within limits, were stated to give proportionately longer protection. Although brittle at room temperatures, the coatings have limited ductility at red heat. The coatings also tend to be self-healing.

Vapor Deposition of Refractory Coatings

Several papers were presented at the 97th Meeting of the Electrochemical Society based on work conducted in Battelle Memorial Institute laboratories on vapor deposition of refractory-type metals and their compounds. One such report stated that molybdenum and tungsten coatings are formed by hydrogen reduction of their chlorides. The platinum group metals are deposited by decomposition of the

KIRK & BLUM OVEN

DRIES TWO COATS OF ENAMEL



. . . Money-Saving Oven Installation at Estate Heatrola Division Noma Electric Corporation Hamilton, Ohio

This conveyorized, moisture removal oven dries two ground coats of frit on stove parts. The oven is direct gas-fired and automatically controlled.

From the unload end, the material passes immediately to spray booths where the second ground coat is applied. The material has retained enough heat from the drying of the first coat to immediately dry the second coat after spraying.

To conserve floor space, heating equipment is mounted on top of the unit, together with recirculating and exhaust fans.

Whatever your need in ovens, for drying, dehydrating or baking, consult KIRK & BLUM. Ask for booklet on "Industrial Ovens".

KIRK AND BLUM

INDUSTRIAL OVENS

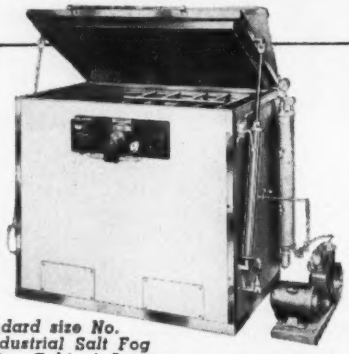
The Kirk & Blum Mfg. Co.
2816 Spring Grove Ave.
Cincinnati 25, Ohio

ACCEPTED

Salt Fog

CORROSION TEST UNITS

BY INDUSTRIAL



Standard size No. 1 Industrial Salt Fog Testing Cabinet. Larger sizes are engineered to suit requirements.

for over-all economy . . .

You have nothing to lose—and much to gain—when you make salt fog tests in an INDUSTRIAL cabinet. These cabinets are built to meet A.S.T.M. B-117-44T salt spray test, also Army, Navy, and Air Force standards.

Consider these features:

- Lucite nozzle with fixed orifice that does not corrode or clog.
- Rubber-lined box for protection against corrosion.
- Accurately controlled enclosed heating.
- Fully insulated for heat economy.
- Air by-pass valve to clear cabinet before inspection of specimen.
- Exhaust flange at rear.
- Air compressor with oil filter. (Cabinet can be connected to other air supply.)
- Air-operated cover lifter (extra).

INDUSTRIAL FILTER & PUMP MFG. CO.

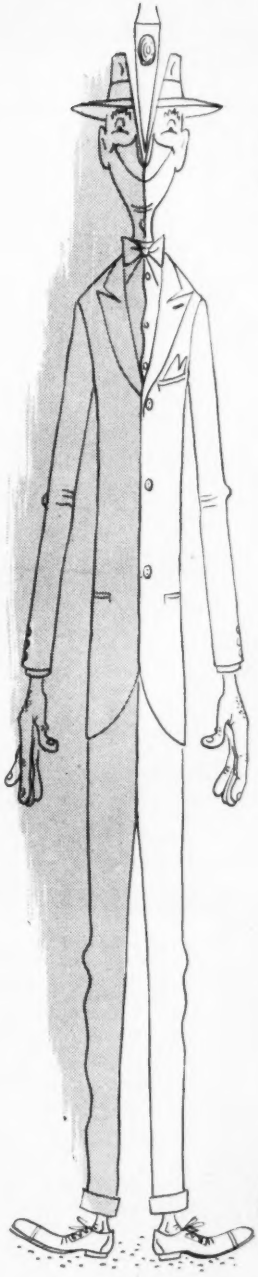
5904 Ogden Avenue Chicago 50, Illinois

carbonyl chlorides. The Battelle workers pointed out that by proper selection of reactions and plating conditions, alloys of most of the refractory metals can be obtained over wide ranges of compositions, thus making it possible to prepare alloys not obtained by conventional methods.

Additional work reported showed that tantalum and columbium coatings are readily deposited on both metallic and non-metallic bases by hydrogen reduction of their pentachlorides at temperatures above 600 deg. C. On refractory bases such as molybdenum, tungsten, and graphite, thermal decomposition of the pentachlorides and pentabromides may be used to produce coatings of these metals. Vanadium deposition was reported to be more difficult to carry out; however, satisfactory deposits of vanadium have been obtained by decomposing vanadium diiodide at 1000-1200 deg. C. on the surface of the work. It was also reported that coatings of the refractory nitrides, borides, and silicides can be obtained by the reaction of metal chlorides with N_2-H_2, BCl_3-H_2, and $SiCl_4$-H_2 atmospheres, at a heated surface under controlled conditions

---

Nearly 500 different standard samples of chemicals, metals, ores, and ceramics are prepared, certified, and distributed by the National Bureau of Standards, Washington 25, D. C., to analytical and research laboratories for use in controlling chemical processes and in maintaining the accuracy of apparatus and equipment. The standard samples are materials which have been carefully analyzed or whose physical properties have been precisely determined at the Bureau and in other laboratories. Some are certified for chemical composition; others are certified with respect to a specific chemical or physical constant; for example, melting point, viscosity, index of refraction, heat of combustion or other properties that are important in scientific research and industrial control.



slice your thinner thinner....

By using Bede Paint Heaters in your spraying operation you can slice your thinner requirements by *one-half or more!* ● You see, when you heat paint, lacquer, synthetic, or whatever finish you use, the heat takes the place of thinner. When hot spraying a normal full coat you use about one-half the amount used with cold spray. And if you want an extra-heavy coat, you really cash in—for *little* or *no* thinner is added to the paint. ● You can list many other outstanding advantages of using Bede Paint Heaters, too.

Paint waste is cut about 20%.

One coat can replace two or three coats sprayed cold.

One gallon of paint will finish 40-50% more units with the same film thickness.

Rejects can be reduced 90-95%.

Sounds impossible, doesn't it? But if you want proof, just write us for the facts. We'll be glad to tell you the whole story—and there's no obligation on your part.

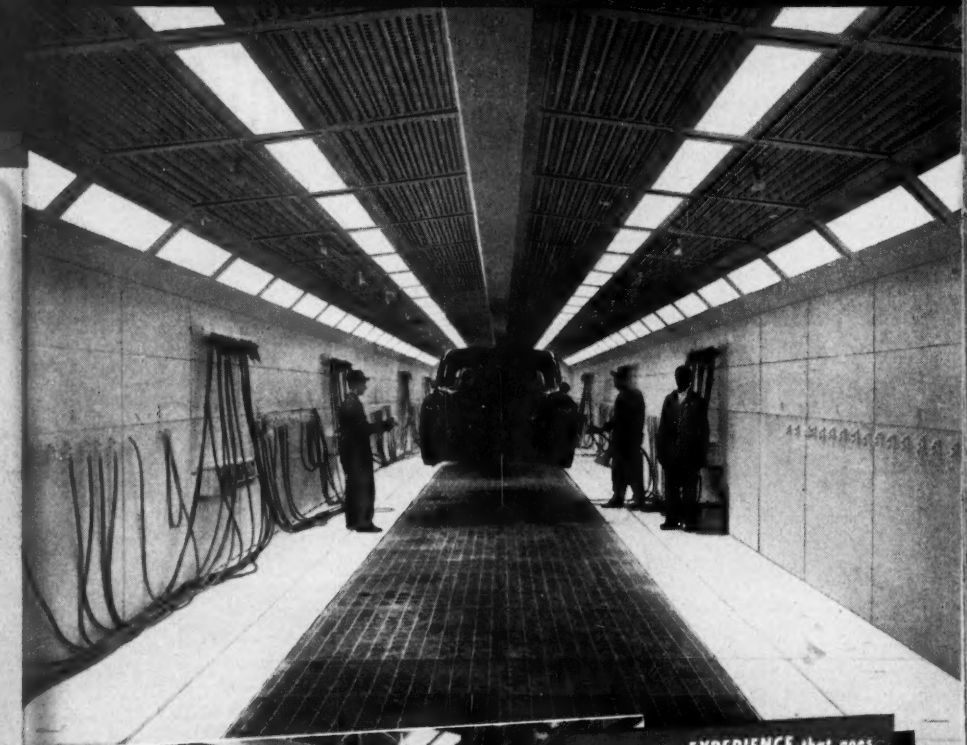
WRITE TODAY for free 8-page bulletin and article giving the complete facts about hot spray.

BEDE PRODUCTS Inc.

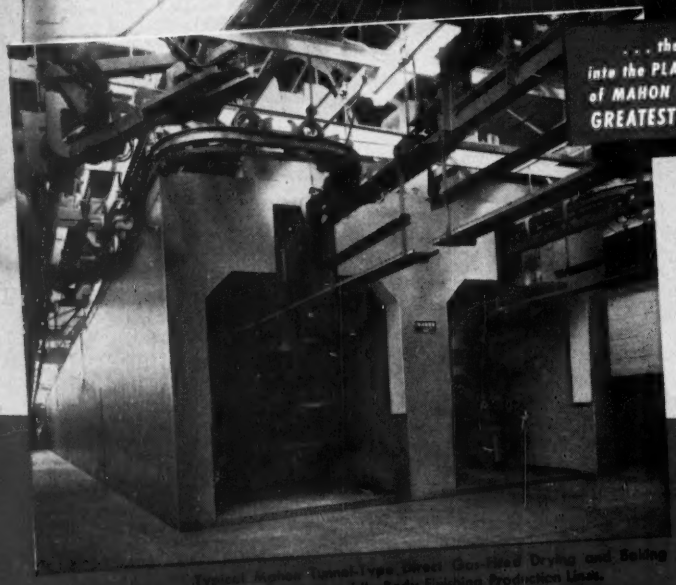
INDUSTRIAL FINISHING SPECIALTIES

4311-A RIDGE ROAD • CLEVELAND 9, OHIO

COMPLET



. . . the **EXPERIENCE** that goes into the **PLANNING** and **ENGINEERING** of **MAHON EQUIPMENT** is the item of **GREATEST VALUE to YOU!**



Typical Mahon Tunnel-Type Direct Gas-Fired Drying and Baking Ovens in Two Automobile Body Finishing Production Lines.

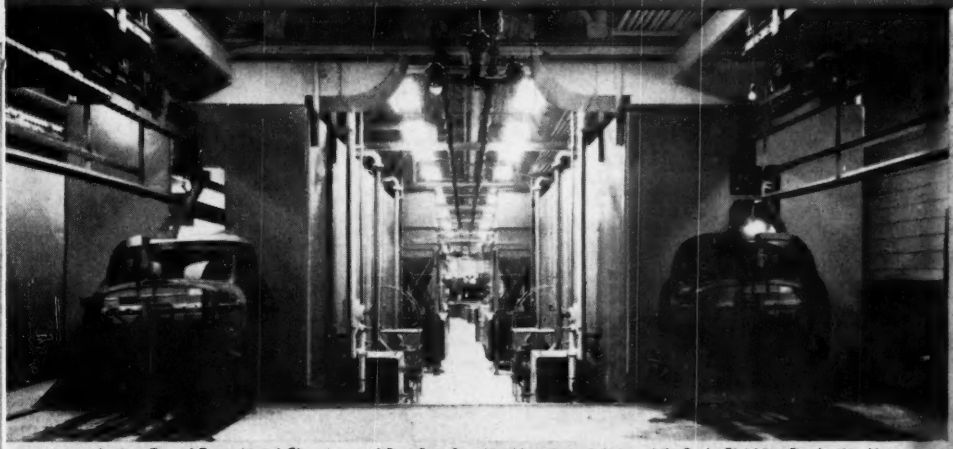
The illustration above shows the interior of a new Mahon Down-Draft Hydro-Filter Spray Booth which was specially designed for automobile bodies. All Spray Booths in this system are equipped with the new "Hydraire" Flood Sheets and Automatic Sludge Segregators and Unloaders.

M

E

Finishing SYSTEMS

. . . for ENAMELS • LACQUER • PAINT • VARNISH



Mahon Tunnel-Type Metal Cleaning and Rust Proofing Machines in two Automobile Body Finishing Production Lines.

MODERN EQUIPMENT Produces FINER FINISH . . . Makes for BETTER WORKING CONDITIONS!

The equipment illustrated on these pages is part of a complete automobile body finishing system recently installed by the Mahon Company in one of the large automobile plants . . . it embodies many new features which make for reduced maintenance, better working conditions, and finer finishes at minimum cost. In the automotive field, as in the household appliance field, and any other industry where finishing constitutes a major production operation, you will find more complete Mahon finishing systems than all other types combined.

Manufacturers, today, turn their finishing problems over to Mahon with complete confidence . . . they do so because they know that the Mahon organization has pioneered development in this highly specialized field for over thirty years . . . they know, also, that broad experience and constant research and experimentation have endowed Mahon engineers with a wealth of technical knowledge and practical know-how not available elsewhere. See Mahon's Insert in Sweet's Mechanical Industries File for complete information, or write for Catalog A-650.

THE R. C. MAHON COMPANY

HOME OFFICE and PLANT, Detroit 34, Mich. • WESTERN SALES DIVISION, Chicago 4, Ill.

Engineers and Manufacturers of Complete Finishing Systems—including Pickling Equipment, Metal Cleaning and Rust Proofing Equipment, Dry-Off Ovens, Hydro-Filter Spray Booths, Filtered Air Supply Systems, and Drying and Baking Ovens; Core Ovens, Hydro-Foam Dust Collectors, Fog-Filters, and other Units of Special Equipment.

AHON

PRACTICAL APPLICATIONS *of Modern Products*

Polishing and Finishing True Temper Products

By N. J. BENTON
Plant Manager
True Temper Corp., Dunkirk, N. Y.

SURFACE finish makes the diamond sparkle, creates glamour, wealth. It is an important criteria of value.

We have come to associate fine finish with fine products and any manufacturing organization is quick to realize the "dollars and cents" result of eye appeal.

Fig. 1—True Temper Solid Shank Taper Forged Shovel

The shovels (see Fig. 1) produced here at our Shelton Works in Dunkirk, N. Y., receive the True Temper treatment for which all of our steel products are so well known. The blades are made of high carbon steel so that they will have the necessary toughness and resiliency to resist wear and chipping and still retain their shape under various working conditions.

After the high carbon steel is forged, the blades are heat treated, and put through a special inspection line to ensure their meeting True Temper standards. They are then polished, assembled, and finished.

For the polishing operation sewed cloth wheels approximately 18 inches in diameter and 4 inches across the face are used. The wheels are double headed and set up with silicate of soda polishing cement (see Fig. 2). They are cured for 8 hours or longer in a drying room with the temperature maintained at about 150 deg. F. After removal from the drying room, the wheels are allowed to cool at room temperature for at least 12 hours. The abrasives used are No. 46 grade and No. 80 grade Exolon RHT aluminum oxide. Careful attention to wheels and abrasive is very important in obtaining the proper finish on the shovels. The smooth finish of a True Temper

Fig. 2—Aluminum oxide abrasive used for setting up polishing wheels is heat treated to provide maximum capillarity which provides a better bond with cold cement.

shovel is revealed in the completed product as the blades are given only a transparent anti-rust coating.

Shovels of many different shapes and sizes are furnished for a variety of uses. Numerous tests are conducted on hardness, flexibility and handle strength to insure the proper shovel characteristics.

On some types of True Temper shovels the wooden handles are fire hardened to provide extra handle strength.

The famous Shelton type shovel is a one-piece, forged, solid shank shovel. This shovel is particularly strong as there is uniform resistance to stress and strain all along the shank.

The wooden handles of True Temper shovels are smoothly sanded and the area where the handle enters the socket is carefully polished to create a uniform finish along the handle and the shank. After the blades are given

Fig. 3—Polishing the shank of True Temper closed socket shovels.

Fig. 4—The surface of this taper formed shovel is being polished brightly with Exolon aluminum oxide grain.

an anti-rust coating, the shanks are enameled in bright colors. The result is a shovel that is very attractive as well as highly serviceable.

Overhead Electric Radiant Oven Aids Gasoline Engine Production

TWO minutes of intense, zoned infra-red heat in a space-saving ceiling-mounted electric radiant oven provides rapid curing action and a hard, true color to synthetic enamel sprayed on gasoline engines manufactured by McCulloch Motors Corporation, Los Angeles. The engines, used on portable power saws which the firm produces, require a tough, durable finish to withstand rough handling in timber cutting operations.

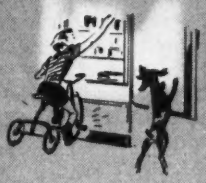
The all-metal infra-red oven, which is conveyorized, delivers consistent results on a production basis with low maintenance cost and trouble-free operation.

For maximum drying speed at the proper temperatures, three zones of heat are provided in the oven. Actually three ovens in one, the unit is made up of three sections of four-foot Chromalox electric radiant heaters, products of the Edwin L. Wiegand Co., Pittsburgh, Pa. The first section through which the work passes is operated at full intensity for high initial heat, and to bring the material very rapidly to the best drying temperature. Heat tapers off in the last two sections through the use of contactors and input controllers to maintain exact baking temperatures. Generally, the heaters in these two sections operate at 50 and 25 per cent respectively, of full capacity; however, humid atmospheres sometimes require operation at as much as 90 per cent of capacity. Heaters may be adjusted easily and quickly by simply turning the input controller knob.

Twenty-one heaters rated at 230 volts, 1800 watts each, comprise the 37.8 kw. oven, which was almost self-constructing. Each of the heaters was bolted to curved steel bands. Spacer sheets of Alzaked aluminum, fitted into grooves on each side of the heaters, increase the efficiency of the oven. Clearance inside the oven is 26 inches, sufficient to handle two sizes of engines weighing 17 and 37 pounds respectively, and rotated as they pass through. Conveyor speed is constant at approximately 5½ feet per minute.

Because most of the volatiles evaporate between the spray booth and oven, provision was made only for natural convection of air through the oven top.

The intense heat emitted by the tubular-type, Inconel sheathed elements is in the "far infra-red" zone of the spectrum and is absorbed with almost equal speed by all colors, so little heat variation is required for the various



TOUGH AND MARPROOF— Kemclad formulations include special ingredients to protect finish against marring, chipping or scratching.

HOT GREASE? NO HARM DONE! — Even hot grease won't damage Kemclad's gleaming white finish!

STAYS WHITE AND STAIN-FREE! — Kemclad Finishes aren't affected by food acids, weak alkalies, alcohols or other common household chemicals.

CLEANS EASILY...SAFELY! —Kemclad's smooth surface cleans easily with damp cloth, but withstands strong detergents safely.

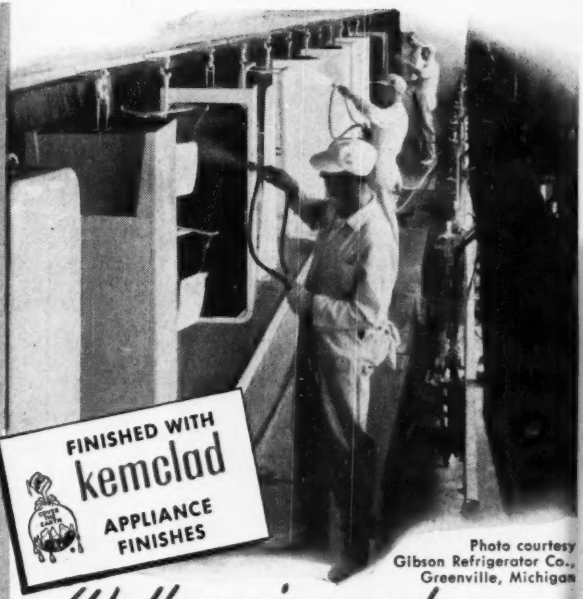


Photo courtesy Gibson Refrigerator Co., Greenville, Michigan

Well engineered...

TO THE LAST 2/1000 OF AN INCH!

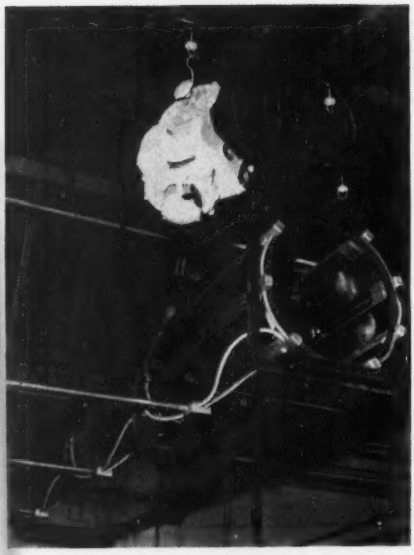
The engineering in the last 2/1000 inch of an appliance—its *finish*—may be even more important than for many of its other parts! Leading manufacturers like Gibson Refrigerator Company prefer S-W Kemclad Appliance Finishes because they provide advantages three ways:

- ***Saleswise,*** **they give the white-for-the toughness and beauty that only the newest developments in synthetic resin materials and know-how make possible.**
- ***Productionwise,*** **they reduce rejects and production line problems.**
- ***Costwise,*** **their high solids content with low viscosity makes finishing cost low for any given thickness of finish.**

Investigate what S-W Finishes may mean in your own production set-up! Call, wire or write The Sherwin-Williams Co., Industrial Div., Cleveland 1, Ohio.

SHERWIN - WILLIAMS

APPLIANCE FINISHES



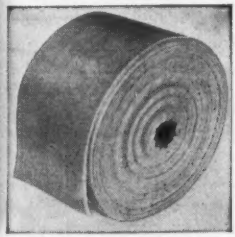
View of McCulloch gas engine emerging from overhead infra-red oven

colors used on McCulloch products. The compact ceiling oven—12 feet above the floor—isn't out of sight, but it is out of mind because maintenance is a very minor factor; no breakage problem exists because of the all-metal heater construction. No floor space at all is taken up by the baking operation.

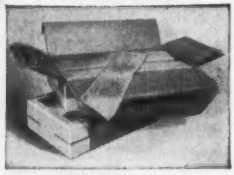
Continuous Conveyor Makes Possible Efficient Cleaning, Dip Coating, and Baking of Folding Metal Chairs

FOLDING metal chairs are traveling a route once covered by 100-pound practice bombs in an efficient conversion of war-time equipment to peace-time use.

Moving along at the rate of 3,500 a day for their final wash and coating, the folding chairs are suspended from



IN ROLLS
Cut off any size piece and use as needed.



CUT BULK
Already cut and folded, ready to use.

NOW! Tack Cloth in Handy Rolls or Cut Bulk

Now you can get Tack Cloth packed the way it's easiest for you to use—either in 150 yard rolls of 36" wide cloth or in handy cartons—100 or more Tack Cloths to the carton.

No matter which way you buy it, you can be sure that every square inch will *stay* SOFT and TACKY until the very last bit is used up.

The Cut Bulk size is 18" x 36"—folded to 4½" x 18" for easy handling. *All of our Tack Cloth is Spontaneous Combustion-Proof, Lint-Free and Wax-Free.* It's clean and sanitary—*there's no waste.*

Write today for complete information, prices and samples.

BAUGHN CHEMICAL PRODUCTS CO.

The Tacky Wiper Specialists

7019 N. Ravenswood Chicago 26, Ill.

Also Individually Packed in Glassine Envelopes—144 to the Carton

— A WARRANTY OF SATISFACTION IN EVERY CARTON —

"Say AH...

Say AHCO . . . say AHCOLOID"

Ahco Buffing Compounds and Ahcoloid Metal Cleaners are the best prescription for "finishing room fever"—caused by drudgery and overwork when you use outmoded cleaners and compounds.

There's an Ahcoloid Metal Cleaner for every industrial cleaning job—yours included . . . prepared by Apothecaries Hall Company chemists with years of experience in prescribing for specific cleaning requirements . . . their research has cut down cleaning time in scores of plants. Ahco Buffing Compounds, for buffing, cutting down, or coloring increase production because they mean more pieces buffed per hour . . . more pieces between wheel dressings.

Since 1849 Apothecaries Hall Company has been helping industry to do its job better; your plant need be no exception. Whatever your cleaning and buffing requirements, write today and learn what Ahco Buffing Compounds and Ahcoloid Metal Cleaners can do for you.

Over 101 Years of Service

APOTHECARIES HALL CO.
WATERBURY 88 CONN

APOTHECARIES HALL CO.
WATERBURY 88, CONN.

Please send me a free copy of your new booklet, "Ahcoloid Metal Cleaning Compounds".

NAME_____

COMPANY_____

STREET_____

CITY or TOWN_____ STATE_____

a conveyor chain that performed a similar duty for Air Force practice bombs during World War II. Conversion of the bomb conveyor to peacetime use was a time and labor-saving idea on the part of the officials of the Hampden Specialty Products, Inc., Easthampton, Massachusetts.

Before the war, chairs were coated by hand, and the daily output was far below today's production. In converting the factory, Hampden made a few minor changes to provide a conveyor that carries the chairs through several baths or rinses, a dipping tank for coating, a drying tunnel, tagging, stamping and assembling operations, and finally to the packing section.

About 500 feet of conveyor chain are used to move a chair from its initial cleaning bath to the packing section, where it arrives an hour later. Running about 12 feet above the floor at its highest point, the chain has a chair suspended by an 18-inch hook every 18 inches. The clamp for the hook presented a problem in the change-over, but Hampden designed a fastener that would meet specifications.

Washed with detergents, rinsed and dried, the chairs move to the 500-gallon dipping tank where the chain takes a six-foot downward plunge to immerse them in an enamel formulation prepared by Monsanto Chemical Company's Merrimac Division (see Fig. 1). Next step in the operation is the infra-red baking tunnel where about 600 lamps of 375 and 500 watts slowly bake the finish at 200 to 390 deg. F. (Fig. 2). Gleaming in their tough, glossy finish, the chairs emerge from the tunnel 5½ minutes later. The formulation devised for Hampden by Monsanto provides the bare metal with a durable, smooth, attractive finish in a single coating.

On the return trip of the conveyor chain, the chairs are stamped and tagged in accordance with state laws.

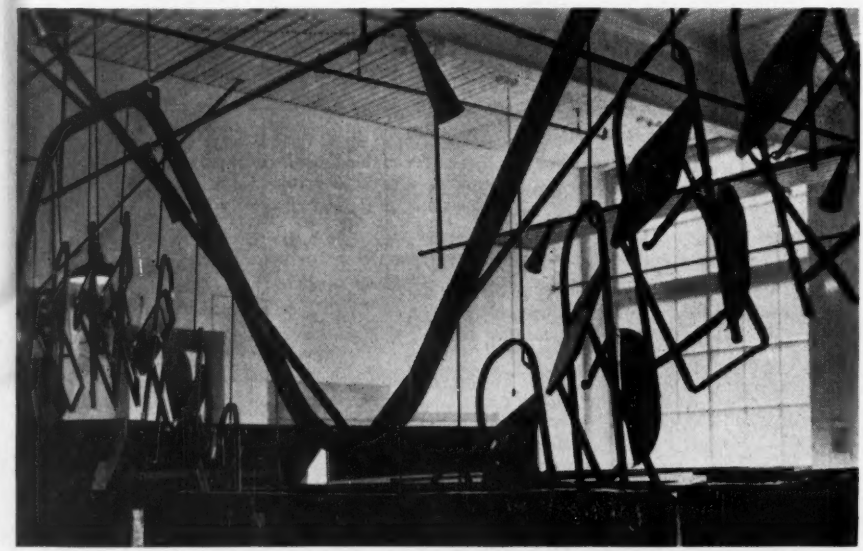


Fig. 1—Washed with detergents, rinsed, and dried, the metal folding chairs move to a 500-gallon dipping tank where the chain takes a six-foot downward plunge to immerse them in an enamel formulation.

Merry Christmas

MAC DERMID

Incorporated

WATERBURY 20, CONNECTICUT

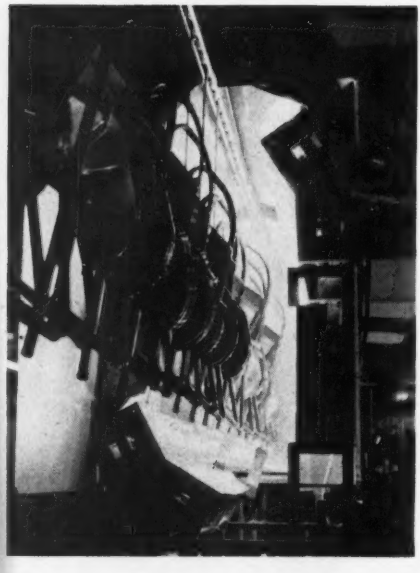


Fig. 2—View of chairs emerging from the infra-red baking tunnel

Backs and strips, hooked to the chair frames for dipping operations, are riveted to the chairs. Seats are attached and the chairs are ready for packing and shipping. The entire process is a four-man operation.

THE rosin ester of 2, 2, 6, 6-tetramethylolcyclohexanol (TMC) — a cyclic, pentahydric alcohol — appears to be superior to ester gum as an additive for nitrocellulose lacquers. Its performance also compares favorably with that of maleic modified rosin esters." Those are the conclusions drawn by Dr. Harold Wittcoff, M. H. Baker, and Louis Champlin, Jr., of General Mills Research Laboratories, in a paper prepared for presentation at the 117th meeting of the American Chemical Society in Detroit, Michigan.

The resin ester of this new alcohol, the paper says, produced harder nitrocellulose lacquer films than did ester gum and made possible the preparation of solutions with higher solids content. In General Mills' tests, it also produced lacquer solutions of lower viscosity than did four commercial, maleated pentaerythritol or glycerol esters of rosin. The films from those solutions proved to be more resistant to alkali.

In a standard lacquer formulation, replacement of ester gum with TMC resin ester increased the hardness of resulting films about 50 per cent without materially changing their flexibility and abrasion-resistance. Replacement of each of the four maleated resins with TMC rosin ester produced solutions with a Gardner-Holdt viscosity of A as compared wtih viscosities of B or C and greatly improved resistance of the films to 5 per cent sodium hydroxide. In hardness, flexibility, abrasion resistance, drying speed, gloss, resistance to temperature change and print resistance, the TMC rosin ester and maleated resin lacquers were comparable. All of the nitrocellulose lacquers tested yellowed under ultra-violet light.

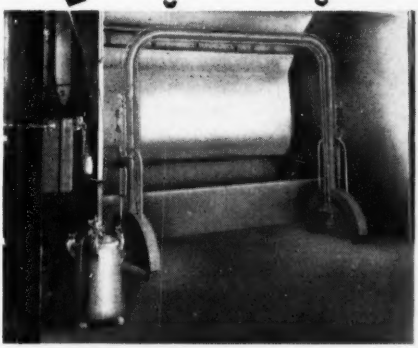
TMC itself is a low melting polyhydric alcohol, formed by the reaction of cyclohexanone and formaldehyde and first reported by the German chemists, Mannich and Brose, in 1923. Because of its four primary and one secondary hydroxyl groups, General Mills believes it may have value in synthetic drying oils, some types of alkyd resins, waxes, emulsifiers, plasticizers, lubricating oil additives, parasiticides and lubricants, as well as in nitrocellulose lacquers. The company's Research Laboratories have developed a process for making TMC, and have been offering samples for evaluation since 1948. "Although General Mills has no immediate plans for the commercial production of TMC," Mr. Baker said, "the laboratories plan to manufacture small quantities of the material for the next few years. TMC has many unexplored possibilties, and we believe it should be kept available for study."

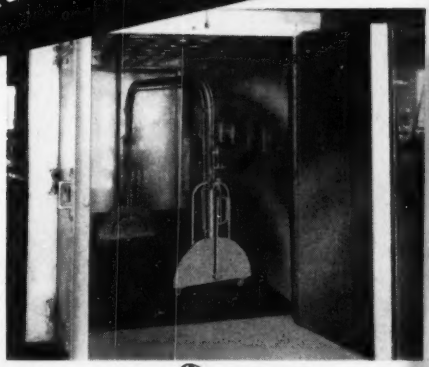
Nickel undercoatings are applied to nearly all automotive parts which are finished by chromium plating. Nickel's function is to inhibit corrosion, while that of the chromium coating is to give a hard, non-tarnishing surface finish.

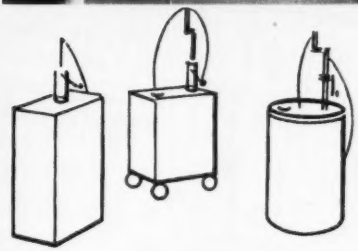
When space means $

YOUNG & BERTKE

FINISHING SYSTEMS ARE BETTER FOR YOU





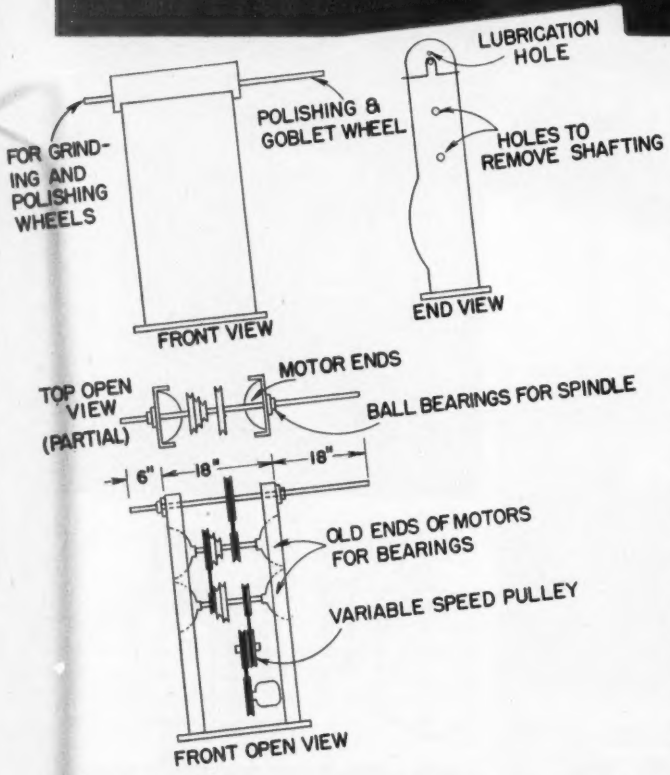


THE FINISHING SYSTEM AT THE PHILLIPS PUMP AND TANK CO. is designed for finishing a variety of objects from a portable carwasher (shown in process of finishing) to pumps and tanks used in service stations. Storage space in this plant is limited. Material has to move quickly from the assembly line through the finishing department to the shipping room. Young and Bertke engineers designed and installed a spray booth and oven that required a minimum of room and facilitated the movement of materials. In installing a finishing system in your plant, let Young and Bertke engineers design it so that *you* will save both time and money. Write us today.

The YOUNG BERTKE Co.

1126 BUCK STREET **CINCINNATI, OHIO**

Suggestion Improves Finishing Process



Long Spindle Variable Speed Polishing Lathe

A job plating and polishing shop performing finishing operations on precious metals, antiques, and small objects developed a need for a small, variable speed, long spindle polishing lathe.

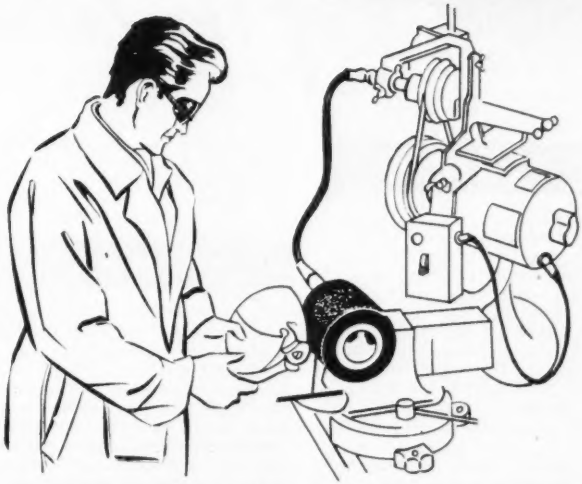
A lathe meeting the needs of the shop was constructed at a minimum of expense as is indicated in the accompanying illustrations. The materials used included channel iron, steel base plate, shafting, ends from old motors for bearings, cone step pulleys, a variable speed pulley, ½ h.p. motor and sheet metal to enclose the frame. The ball bearing type, long spindle lathe thus designed and built made possible delicate polishing operations on recessed parts and long pieces without the danger of marring the objects by contact with the polishing lathe, as might be expected with a short spindle lathe of the usual design. Also, since the main shaft rotates in ball bearings, the inconvenience of re-pouring soft metal bearings has been eliminated.

This suggestion was submitted for publication in PRODUCTS FINISHING by Murray E. Kauffman, Chambersburg, Pennsylvania.

Send employee suggestions which have resulted in improved finishing processes (electroplating, lacquering, enameling, porcelain enameling, galvanizing, and so on) to PRODUCTS FINISHING. The suggestors will be paid for all suggestions accepted for publication.

PRODUCTS FINISHING 431 Main Street • Cincinnati 2, Ohio

NEW, IMPROVED **NU-MATIC**



THE WHEEL WITH THE PNEUMATIC DRUM

With this Nu-Matic wheel the abrasive belt rides on a cushion of air contained in a rubber drum. Different pressures in the drum and different grits provide varied surface finishes. Deflate, and belts can be changed easily and quickly for grinding, sanding or polishing. Cut your labor, production and inventory costs with Nu-Matic grinding units. Adapters for 5/8"-11 or 1/2"-13 power equipment. (Specify size.)

Adaptable to bench, portable or flexible shaft power.

NU-MATIC GRINDERS, INC., 10304 W. McNICHOLS RD.
Detroit 21, Michigan UNiversity 3-2573

NEWS of the Industry

NEW PLANTS

The first of the nation's all-purpose synthetic rubber plants to be reactivated under the government's expanded rubber program started production at Port Neches, Texas, recently. The huge plant, designed with a production capacity of 60,000 long tons a year, has been thoroughly modernized by engineers of **UNITED STATES RUBBER COMPANY** so that it will produce more than 72,000 long tons a year when operating at peak load.

The rubber will be used to meet the nation's skyrocketing civilian and military demands for tires and other rubber products.

RICHARDSON-ALLEN CORPORATION, manufacturer of selenium rectifiers for the conversion of a.c. and d.c. current, battery chargers, and various types of industrial controls, has moved to its new office and factory at 116-15 Fifteenth Avenue, College Point, Long Island, New York.

C. E. Brigham, vice president, reports that the move to more advantageous quarters was planned to improve not only present facilities but also to permit future engineering developments of the corporation in line with recently inaugurated improvements on all its items.

According to an announcement by Jesse Levine, **HENRY LEVINE & SON, INC.,** electroplating consultants, has moved the Forest Hills office and laboratory to the Jackson Building, 153 East 26th Street, New York City. This expansion and relocation of the laboratories will enable the organization to offer a more complete service to the metal finishing industry.

COMPANIES

In order to contribute to greater consciousness in ceramic education, **FERRO ENAMEL CORP.,** Cleveland, Ohio, again announces a Student Competition in Porcelain Enameling. The competition is open to students, both graduate and under-graduate, in ceramic schools in the United States and Canada, and cash prizes totaling $1,000 will be offered. The first prize will be $500, second, $300, third, $100, and fourth and fifth, $50 each. Prizes will be awarded for the best papers dealing with any phase of porcelain enameling technology.

The contest will close March 16, 1951; however, entry blanks must have been submitted by January 15, 1951. The prizes will be awarded at the Fifty-Third Annual Meeting of the American Ceramic Society, which will be held at Chicago, Illinois, April 22-26, 1951.

The Judges will be: Charles S. Pearce, secretary, The American Ceramic Society, Columbus, Ohio; Edw. Mackasek, managing director, Porcelain Enamel Institute, Inc., Washington, D. C.; and Dr. G. H. McIntyre, vice president and director of research, Ferro Enamel Corporation, Ohio.

In announcing the 1951 Contest, Dr. G. H. McIntyre, speaking for the sponsor, Ferro Enamel Corporation, stated that the judges and his company were very pleased with the results of last year's Ferro contest. All contributions were exceedingly high in quality and wide interest was created by the effort.

Students wishing to enter the Ferro contest may contact the head of the Ceramic Department in their school, or the Ferro Enamel Corporation for complete rules.

DIAMOND ALKALI CO., Cleveland, Ohio, has announced the purchase of the chromic acid business of **E. I. DU PONT DE NEMOURS AND CO.**, Wilmington, Del. The product will continue to be manufactured by Du Pont at its Philadelphia plant, and under the terms of the sale, Diamond will take over distribution of the product on January 1, 1951.

Du Pont is one of three chromic acid producers in the United States. It has been in this business approximately 15 years and holds a large share of the national market for the product which is estimated at 20,000,000 pounds annually. Diamond is a major manufacturer of sodium bichromate, an essential raw material used in the manufacture of chromic acid, with facilities located at both Kearny, New Jersey, and Painesville, Ohio. Nearing completion at both these units is a rehabilitation, modernization, and expansion program costing in excess of $5,000,000.

How recent developments in the field of cleaning and allied procedures are helping industry meet the demands of increased production was the central theme of a series of technical-sales meetings held in New York, Cleveland, and Hollywood, California, during the month of November by **OAKITE PRODUCTS, INC.**

As in former years, the meetings were in the nature of a general sales and technical review, embodying round-table discussions on new materials and servicing methods designed to save time and work on a wide range of industrial cleaning and associated tasks. Special reports presented by Oakite research chemists, service engineers, and technicians on latest trends in cleaning and related practices for nearly every branch of industry were features of these meetings. Also discussed were new materials to be made available by the Company during the coming year.

Under the auspices of the **ANGLO-AMERICAN COUNCIL ON PRODUCTIVITY** in cooperation with the **ECONOMIC COOPERATION ADMINISTRATION**, a group of 13 British scientists visited the United States to study modern American finishing practices during August and September.

On the agenda was a visit to **MAAS & WALDSTEIN COMPANY**, manufacturer of lacquers, enamels, and synthetics, Newark, New Jersey, Chicago, and Los Angeles.

Subjects such as the pretreatment of metals, including die castings, novelty finishes such as Hammertone, Motletone (one coat hammered-effect finishes), Flashdur (flash baking enamels), Pebltone, Coprene (chlorinated rubber base finishes), Synpex (combination lacquer synthetic type finishes) and the various methods of application of these finishes were described in detail. The use of specially formulated M & W finishes for electrostatic spray was discussed at length as well as other M & W products specially formulated for hot application.

After an entire morning of discussion led by Dr. G. Klinkenstein, president, and B. F. Ames, sales manager of Maas & Waldstein Company, the entire group witnessed demonstrations of many novelty finishes applied in the company's laboratory and pilot plant.

The visitors shown in conference with Mr. Klinkenstein and Mr. Ames during their visit to the Maas & Waldstein Company.

IT'S *Phillips* FOR
PRECISION CLEANING OF PRECISION PARTS AND INSTRUMENTS

ST-1 COMBINATION RECOVERY STILL DEGREASER

$245.00
F. O. B. CHICAGO

Reclaims Trichlorethylene and Perchlorethylene at the rate of 5 gallons per hour. Can also be used as a degreaser by immersing parts in boiling sump then into vapor area for the rinse and dry off.

Inside dimensions of each compartment: 14″ x 15″ with 11″ working depth.

Write for full details and FREE Booklet— "Vapor Degreasing Questions and Answers"
DEPT. D

PHILLIPS MANUFACTURING COMPANY
3475 TOUHY AVENUE • CHICAGO 45, ILLINOIS

THE ROTO-FINISH COMPANY of Kalamazoo, Michigan, is rapidly completing the construction of an addition to its present plant. The new unit will greatly increase manufacturing facilities, according to D. T. Barrett, president.

PENNSYLVANIA SALT MANUFACTURING COMPANY has announced the removal of its Chicago district sales office from 20 North Wacker Drive to Suite 1216, Builders Building, 228 North LaSalle Street.

The office will be under the direction of George D. Grogan, district sales manager for the company's Heavy Chemicals Department, and John C. Hampson, district sales manager for the Special Chemicals Department.

Charles Miller has become sole owner of **THE FILTER PAPER CO.**, 2433 S. Michigan Ave., Chicago 16, Ill., having purchased the full interest of his partner.

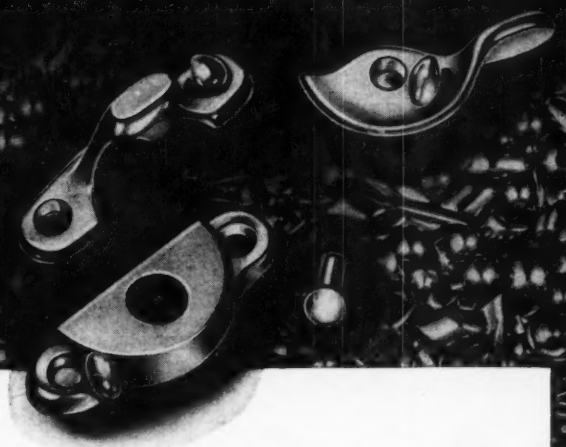
The company handles equipment and materials for the metal plating and finishing industry, including plate-and-frame filter presses, water filters, stainless storage and mixing tanks, portable agitators, pumps, filter paper, filter cloths and bags, and other products.

Irving Flaumenhaft, president, has announced that **LACQUER & CHEMICAL CORP.**, Brooklyn, N. Y., has established a program for distribution of its newly developed industrial finishes line.

CHICAGO EYE SHIELD COMPANY, manufacturer of Cesco head and eye protection equipment, announces the appointment of Guardian Safety Equipment Co., Birmingham, Ala., distributor for the State of Alabama and Mississippi. Howard Freed, who formerly serviced industrial plants in Ohio for Williams & Company, will head the new distributorship.

In addition to Cesco products a complete line of supplementary equipment, including gloves, clothing, aprons, ladder shoes, safety belts, and so on, will be carried. Office and stock will be maintained at 4215 First Avenue N., Birmingham.

in BURNISHING MATERIALS



it's the SHAPE that counts!

Smooth burnishing of rounded corners, undulating curves, deep depressions and rounded projections is the special job of Abbott Ovalballs. They're shaped to do the job right!

Abbott Burnishing Materials, available in five shapes . . . Ball, Ovalball, Cone, Diagonal, Pin . . . are scientifically designed to make effective contact on metal stampings or castings of any size and shape. Each piece is a burnishing tool made from Abbott high quality bearing ball steel. Each is deep hardened and polished to a mirrorlike, glass-hard finish. For the *best* burnishing results . . . use Abbott!

Some parts require a special mixture of Abbott Burnishing Shapes. Send for catalog . . . No obligation.

THE ABBOTT BALL COMPANY
1054 New Britain Ave.,
Hartford 10, Conn.

ABBOTT
the all round ball

The **PENNSYLVANIA SALT MANUFACTURING COMPANY** has opened a sales office in the Woolsey Building, 2168 Shattuck Ave., Berkeley, California.

Making their headquarters at the new office are R. A. Snyder, in charge of technical sales service work for metal and maintenance cleaners in industries of California, and J. Cameron Siddall, who handles technical sales and service for agriculture in California, Arizona and New Mexico.

Dudley B. Blake

Formation of **BLAKE PAINT CORPORATION** was announced recently by its president, Dudley B. Blake. Offices are at 103 East 105th Street in New York City.

Mr. Blake stated that "personalized service" would be rendered to manufacturers using lacquers, synthetics, enamels, varnishes, thinners, wrinkle and hammer finishes, and vinyl coatings.

Mr. Blake recently resigned as general sales manager of United Lacquer Manufacturing Corporation. Prior to that, he was vice president in charge of sales of The Monroe Sander Corporation.

DUALHEET INC., Cleveland, Ohio, successor to the Beck Equipment Company, Paint Heater Division, announces that Underwriters Laboratories has approved the use of Dualheet Paint and Air Heater Model 225 in hazardous locations. Having a capacity of 15 gallons per hour, the unit is said to afford safe and efficient spraying of finishes at elevated temperatures.

The **PENNSYLVANIA SALT MANUFACTURING COMPANY** has announced that it will transfer all production now remaining at its Easton plant to its plant at Cornwells Heights, Pennsylvania, by December 31.

Transferred to the new location will be production facilities for several of Pennsalt's laundry and dry cleaning products, emulsion type metal cleaning compounds, and the Eastern reshipping point for hydrofluoric and anhydrous hydrofluoric acids.

The company also announced that R. W. Tomlinson, superintendent of the Easton plant, has been appointed superintendent of the Cornwells Heights plant, replacing R. O. White, who is to become superintendent of Pennsalt's new plant now under construction at Montgomery, Alabama.

Appointment of Aviquipo, Inc., as distributor of **THE GLIDDEN COMPANY'S** aircraft finishes was announced by A. D. Duncan, vice president in charge of the Paint and Varnish Division.

The aircraft finishes, known as "Glidair," will be distributed through Aviquipo subsidiaries in England, France, Portugal, India, South Africa, Australia, Thailand and six countries in South America.

Organization of a nation-wide system of service depots has been completed by the **PYRENE MANUFACTURING COMPANY,** Newark, New Jersey, manufacturer of hand extinguishers and other fire-fighting equipment. Services offered include immediate exchanges, replacement parts, repairs, and trade-ins.

Common replacement parts for various types and sizes of soda-acid, foam and cartridge-operated water, and anti-freeze types are now carried in stock.

NEW POSITIONS

Promotions in the staff of the Research and Developments Department of Commercial Solvents Corporation have been announced by T. S. Carswell, vice president.

DR. RICHARD S. EGLY has been appointed director of chemical research at Terre Haute, Ind. Formerly in charge of chemical engineering research, he has supervised important work upon many of the corporation's products.

JAMES W. BULLS, formerly chemical engineer in charge of the research group at the company's Sterlington, Louisiana, plant, has been placed in charge of chemical engineering research at Terre Haute, Ind. Replacing Mr. Bulls is **JOHN J. DORSEY,** who was previously in the chemical engineering group at Terre Haute.

ROBERT A. SHURTER has been made assistant in charge of the microbiological

How to get Finer Finishes at Lower Costs

with GLOBE

Direct Motor Drive

TILTING TUMBLING BARRELS

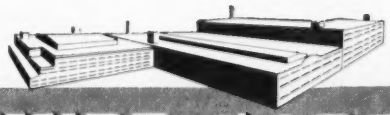
Available in Kiln-Dried Maple or Steel Shells

Process thousands of pieces at one time—faster, better and at lower cost—with Globe Precision Tumbling Barrels, dependable for 47 years. Globe's exclusive six-way work shifting motion cuts tumbling time and increases action. Speeds as low as 30 revolutions per minute assure finer finishes of non-ferrous metal parts. Motor is compactly mounted above the gear segment for space economy.

Free Experimental Service

Hupp's Experimental Engineering Laboratory can show you how to cut finishing costs. Just send samples of the parts to be processed along with a finished part. Write today! There's no charge or obligation.

Hupp Manufactures a Complete Line of Tumbling Barrels and De-Burring Machines.



HUPP CORPORATION

GLOBE STAMPING DIVISION

1250 WEST 76th STREET • CLEVELAND 2, OHIO

SERVING INDUSTRY SINCE 1902

pilot plant, where he will be responsible for recovery and extraction processes, as well as all engineering in the pilot plant.

R. R. SPIEGELHALTER, who received his M.A. from the University of Kansas, has joined the research staff as analytical chemist.

E. C. BARLOW has become affiliated with Charles J. Haas, Inc., Philadelphia, manufacturer of industrial chemicals, oils, and greases.

Mr. Barlow was formerly with E. F. Houghton & Company for 24 years in the capacity of sales manager for the Central Division, and he was later appointed assistant to the executive vice president.

CARL BAUER has been promoted to the newly created post of vice president in charge of industrial sales of Standard Varnish Works, New York and Chicago. Mr. Bauer was formerly industrial sales manager of the firm's New York operations. His new duties represent a consolidation of the Eastern and Western sales activities under a single administrative head.

J. PETER JORDAN, industrial sales manager of Standard Varnish Works, Chicago, will continue to serve in that capacity.

FRANCIS E. MURPHY has been appointed production supervisor of the Wyandotte works of the Pennsylvania Salt Manufacturing Company, it was announced by William F. Mitchell, vice president in charge of manufacturing. In this capacity, Mr. Murphy will be in active charge of all Pennsalt's chemical plant operations in Wyandotte and will report to H. J. Eichenhofer, assistant superintendent.

Mr. Murphy joined Pennsalt in 1943 as assistant to the manager of research and development. In 1945 he was transferred to Pennsalt's Whitemarsh Research Laboratories as director of development, and in 1947 came into the manufacturing division as assistant production manager. Later he became supervisor of process controls, the position he held before being appointed to Wyandotte.

A graduate of St. Joseph's College, Philadelphia, Mr. Murphy is a member of the American Chemical Society, the American Institute of Chemical Engi-

We Wish You

A Merry Christmas

and **A Happy New Year**

THE STRIPLASTIC COMPANY

JIM AARONS

J. M. AARONS

10828 QUEBEC AVE.
CLEVELAND 6, OHIO

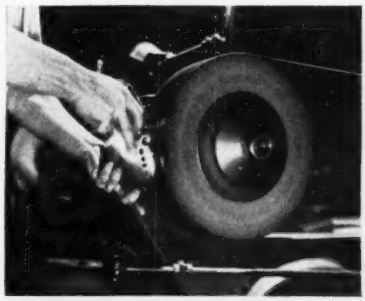
Quick way TO THE RIGHT FINISH

BEHR-MANNING

METALITE® CLOTH BELTS

If it's a pre-plating finish you can do it faster because of the absence of wild grain marks. Grains are anchored firmly in place® in a strong, DURA-BONDED® grip. Result is the elimination of buffing. Besides being held rigidly in place, grains are evenly spaced and sized so that an all-over, uniform finish is rapidly obtained with METALITE Belts.

When polishing contours, METALITE Belts and BEHR-MANNING "cushioned" contact wheels combine to produce the correct belt pressure and flexibility for a superior polish with the fewest possible belt passes. It all adds up to time saved, operations reduced or eliminated, increased rate of production — and more profits.



READ "PROVING GROUND FOR PRODUCTION" and see how the latest finishing methods can be quickly evaluated in your specific operations. Mail the coupon today.

BEHR-MANNING

TROY, N. Y.

Use NORTON® abrasives sharpening stones

BEHR-MANNING, Troy, N. Y., Dept. PF-12

Please send me a copy of your "Proving Ground for Production."

Name ..... Title .....

Company .....

Street ..... County .....

City ..... Zone ..... State .....

neers, and Franklin Institute of Philadelphia.

Mr. Mitchell also announced that **JOHN BOGEN**, formerly with Pennsalt's production department in Philadelphia and the staff at the Calvert City, Kentucky plant, has been transferred to Wyandotte.

Almo D. Squitero

The Hanson-Van Winkle - Munning Co., Matawan, N. J., announces the appointment of **ALMO D. SQUITERO** to the post of electrochemist.

Mr. Squitero is a graduate of the Michigan State College with the degree of bachelor of science in chemistry, and a year of graduate work in electrochemistry. He has had wide experience in electroplating, electrotyping and electroforming.

Robert G. Van Keuren

ROBERT G. VAN KEUREN has been appointed chief sales engineer for the Abrasive Division of Norton Co., Worcester 6, Mass., according to an announcement by Ralph M. Johnson, vice president in charge of sales. Mr. Van Keuren succeeds A. Oakleigh Bush who died September 2.

Since 1945 Mr. Van Keuren has been a section head in the Sales Engineering Department. He joined Norton in 1923 as a member of the Adjustment Section in the Worcester sales department, and in 1929 transferred to the Sales Engineering Department.

EDWARDS S. HAWKINS, chemical engineer with Detroit's Rinshed-Mason Company, manufacturer of automotive and industrial lacquers and enamels, has been assigned general manager of the company's recently purchased Western division factory and warehouse at Anaheim, California.

Edward S. Hawkins

Since graduating from West Virginia University in 1935, Mr. Hawkins has been continually active in paint research, and had most recently been director of all R-M automotive finishes research at Detroit.

Appointment of **E. D. STOWELL** to represent the United Lacquer Manufacturing Corp., Linden, N. J., manufacturer of industrial and automotive finishes, throughout northern New York State was announced recently.

In his new connection, he will promote United Lacquer's line of synthetics, enamels, lacquers, and protective coatings to industrial users in Rochester, Schenectady, Syracuse, Utica, Troy, Albany and adjoining industrial centers,

---

G. W. Fine

The appointment of **G. W. FINE** as assistant sales manager of U. S. Stoneware's Plastic Coatings Division has been announced by Howard Farkas, executive vice president of The U. S. Stoneware Co., Akron, Ohio.

Mr. Fine studied chemical engineering at Case School of Applied Science and had been associated with Sherwin-Williams Company for seven years, first as a laboratory technician and, upon his discharge from U. S. Air Force, as a member of the sales staff.

SAVE ON WHEELS . . . STEP UP PRODUCTION

Speeds from 1,500 to 3,000 RPM are instantly available with the turn of the dial while the lathe is in operation. Polishing and buffing (cut-color-satin) can be done on one machine with no delays or lost motion.

The Hammond VRO Variable Speed Polishing Lathe definitely will step up production and improve finish. Maximum wheel economy is assured, too, because efficient peripheral speed can be maintained at all times — wheels can be used right down to the flanges before discarding.

Hammond

VRO

VARIABLE SPEED

POLISHING AND BUFFING LATHE

the DIAL does it

WRITE FOR CATALOG
Catalog showing all Hammond polishing lathes, abrasive belt, "OD" and automatic finishing machinery gladly sent on request. Write today!

Hammond of KALAMAZOO
GOOD MACHINERY SINCE '82

Hammond Machinery Builders INC.

1622 DOUGLAS AVENUE • KALAMAZOO 54, MICHIGAN

EDWIN C. ELLIOTT has been added to the sales staff of the Plating and Polishing Division of Frederic B. Stevens Inc. of Detroit to represent the company in New York State, with headquarters at 95 Highland Avenue, Geneva, New York.

Edwin C. Elliott

He was formerly connected with the Geneva Forge, Inc. in the capacity of plating superintendent. He has wide experience in both manual and full automatic plating and polishing operations.

Mr. Elliott succeeds **E. T. HOMAN**, one of the oldest active members of the A.E.S., a charter member of the Philadelphia Branch, and widely known throughout the industry. Up to the time of his retirement Mr. Homan had, for many years, covered New Jersey, New York, and part of the Pennsylvania territory for Stevens.

GEORGE D. GROGAN and **DONALD MACFARLAN, JR.**, have been appointed district sales managers in Chicago and Detroit, respectively, for the Heavy Chemicals Department of the Pennsylvania Salt Manufacturing Company, it was announced by R. S. Roeller, manager.

Mr. Grogan formerly was a product supervisor in the Philadelphia office and Mr. Macfarlan formerly was a sales representative in the Paterson, N. J., office. **H. G. POTTS**, formerly district manager in Detroit, has been named supervisor of technical service for the Midwest areas. **H. A. SMITH**, formerly manager in Chicago, has been given special assignments in the heavy chemical field in the Chicago area.

L. H. BRANDT, formerly manager of technical service, has been appointed product supervisor in the Philadelphia office. **A. C. JONES**, formerly Philadelphia district sales representative, and **MISS E. M. DeHAAS** have been appointed assistant product supervisors.

C. M. FEHR and **V. C. LANE**, sales engineers, have been assigned all technical service work in the Philadelphia, Paterson, Pittsburgh, and Cincinnati districts. **H. R. BISHOP**, formerly sales representative in Chicago, has been transferred to the Paterson office.

Industry's 3 Newest

COLD STRIPPERS

Fast! Economical! Safe! New!

"UNISOL"—for removing all baked enamels! Used cold—Non-inflammable —Non toxic—Strips baked enamels in seconds—Used for all type metals—Requires no rinse—Non-injurious to hands or clothing.

"UNISOL No. 2"—A new cold stripper for japans and vinyls—Non-inflammable —Strips tough japans and vinyls in matter of minutes—Used for all type metals.

"STRIPPER 202"—Something new for removing "stop-off" lacquers in seconds —Will not tarnish highly polished metal surfaces—Non-inflammable —Used cold—Non toxic.

Samples and further information supplied on request.

CHEMCO PRODUCTS CO., Inc.

7740 WEST 47TH STREET LYONS, ILLINOIS

Riegel

THE BIAS BUFF

RELIABILITY

--from the Customer's Viewpoint

IN normal times many users of buffs and wheels think of buff buying as just a routine matter—that buffs are pretty much alike, and most any buff will do a job.

But careful buyers, in the most successful finishing plants don't look at it that way. They see that the buffs they buy will do their job best — that they can be sure of their requirements when times are not normal; and further — that there's a stability behind the supply source upon which they can depend.

These are points which "BIAS" customers believe are important, and in which their confidence in our company is not misplaced.

The BIAS Buff & Wheel Co.
Division of RIEGEL Textile Corporation
3464-66 Hudson Boulevard
Jersey City 4, New Jersey

Louis V. Gagnon

The Bart-Messing Corp., Brooklyn 6, N. Y., has announced that **LOUIS V. GAGNON** of Natick, Mass., has been appointed New England representative.

Since 1946, Mr. Gagnon had been in charge of the razor finishing departments at the Gillette Safety Razor Company. He is a graduate of Franklin Technical Institute in industrial chemistry and of the Lowell Institute School at M.I.T. in mechanical engineering. He is well known throughout New England because of his activities in the A.E.S. and has just completed his third year as president of the Boston Branch of the Society.

The appointment of **FRANK G. DRAKE** as general sales manager of Bede Products Inc., Cleveland, Ohio, has been announced by James A. Bede, president. Mr. Drake will succeed **RICHARD E. ESTABROOK**, who has been advanced to general manager.

Frank G. Drake (left), Richard E. Estabrook

Formerly Eastern district sales manager, Mr. Drake has had over 35 years of experience in the finishing field. For 25 years he was sales promotion and advertising manager of The Egyptian Lacquer Manufacturing Company.

ALBERT H. CLEM has been appointed to the newly created position of assistant to the vice president in charge of sales of the Pennsylvania Salt Manufacturing Company, it was announced by William P. Drake, vice president.

Mr. Clem was formerly assistant manager of sales in Pennsalt's Special Chemicals Department. In his new position he will handle special assignments for the vice president.

Dr Drake also announced that **HORACE F. McINTYRE**, formerly Philadelphia district sales manager for the Special Chemicals Department, has been appointed product supervisor in that department. **JOHN M. DAVIDSON**, formerly a sales service representative in the Pittsburgh district, became Philadelphia district sales manager.

Mr. McIntyre joined Pennsalt in 1943 as a Special Chemicals sales service representative in the New York district. He became Philadelphia district manager in 1949. Mr. Davidson joined Pennsalt in 1946 following service as a commander in the naval air force and has been with the Pittsburgh office until his transfer to Philadelphia.

BARREL PLATING

The famed OLS type, engineered and developed by Daniels. Over 30 years producing plating barrels for industrial uses.

PRODUCTION

Daniels OLS Plating Barrel does more work per day than any other machine. No overhead devices. No solution dumping. Faster loading and unloading — saving time and labor.

MAINTENANCE

OLS machines require least maintenance. Replacements are few in number and extremely low in cost.

We make Equipment to meet all Production Requirements.

DANIELS PLATING BARREL & SUPPLY CO.

DANIELS MANUFACTURERS & DISTRIBUTORS Electroplating and Polishing Equipment and Supplies

129 Oliver Street, Newark 5, N. J.
Telephone MArket 3-7450

NO WASTED MOTION HERE

with

Cambridge WIRE BELTS

Cambridge Wire Belts are efficient workers in your field. They serve in heat, cold, corrosive and wet processes; through packaging and assembly operations—moving quickly or slowly at constant or varying speeds. Wherever a material can be processed during movement, a Cambridge belt can, and does, save time, money and floor space.

Cambridge offers you a modern engineering staff with experience in your field and skilled workmen to produce the right belt in the correct mesh and weave, metal or alloy to perform your operation better . . . for longer.

A Cambridge Rod-Reinforced Belt permits continuous, uniform heat treating of metal parts. Open mesh assures free circulation of heat and air—design gives greatest strength, straight travel and successful operation up to 2100° F.

Consult your Cambridge representative — look under "Belting, Mechanical" in your Classified Telephone Directory or write direct.

FREE BOOK—Famous throughout industry as the most valuable reference work on belts and conveyor systems. Write for your free copy . . .

Cambridge Wire Cloth Co.

Department A
Cambridge 12, Md.

Wire cloth in rolls. | Also specialized wire fabrications

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

(Left to right) John M. Ehni, Emil F. Frey, and Henry M. Kidd

In line with a general program of improving the facilities and strengthening the organization to meet continuing product demands, the advancement of several sales executives of The DeVilbiss Company, Toledo, Ohio, has been announced by Roy A. Guyer, vice president in charge of sales.

EMIL F. FREY, now in his thirty-fourth year with the sales organization of DeVilbiss, moves upward from his former post of assistant sales manager to become director of sales promotion and advertising. At the same time, former assistant sales manager **HENRY M. KIDD** becomes sales manager of spray equipment sales, having spent 16 years in the sales division.

Now assuming the joint duties of export manager and branch plant coordinator is **JOHN M. EHNI,** a veteran of 28 years with DeVilbiss.

Two sales promotions have been announced by Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J. **JOHN T. M. FREY** has been appointed assistant manager of the New York Branch and **LAMAR S. HILTON** is now assistant sales manager of the Abrasive Wheel Department.

Mr. Frey has been a member of Manhattan's New York sales organization for many years. Mr. Hilton formerly served in the capacity of sales engineer.

R. M. BROWN, formerly sales engineer with the Bristol Company of Canada, Ltd., and lately instrumentation engineer with Stadler Hurter & Company, Montreal, consulting engineers, has rejoined The Bristol Company, according to announcement made by H. E. Beane, general sales manager. He will be stationed at Baltimore, Maryland.

Mr. Brown is well known in instrument circles and is the author of several papers on the application of instruments in the pulp and paper industry.

HONORS

J. E. UPHAM, eastern New England representative of the Atlas Powder Company's Industrial Finishes Department for the past 25 years, retired on August 1, completing a sales career in finishes dating back to 1907. A group of his associates tendered him a farewell dinner on July 14 at Stamford, Connecticut, and presented him with a silver smoking set.

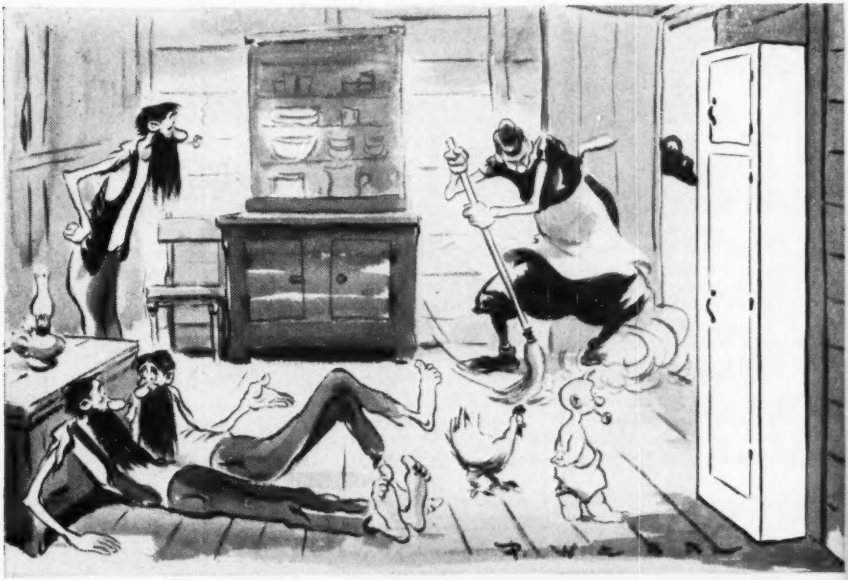
Mr. Upham's territory will be taken

AMERSIL ELECTRIC IMMERSION HEATERS
Ideal for Heating of Pickling and Plating Solutions

Amersil heaters are built of an acid proof tube of fused quartz containing a nichrome heating element. Fused quartz has the unusual combination of inertness to corrosion, high electrical resistance and is immune to thermal shock.

Heaters are available in a wide range of styles and sizes. *Write for literature.*

AMERSIL COMPANY, INC.
900 PASSAIC AVENUE EAST NEWARK, N. J.



"Maw shore wastes a lotta time sweepin' since she got thet new VEDOC finished broom cabinet"

Things happen when folks come in contact with products finished in Vedoc. Sales zoom. Dealers get happy. Inventories disappear overnight. And—no wonder! You just can't beat that hard-wearing, good-looking, one-coat baked finish. It's sanitary, easy-to-clean, and scuff-resistant. It's practically immune to soaps, alkalies, detergents, fats, grease and moisture. Available in white or pastels; baking time is 20 minutes at 300°F. or 7 minutes with Infrared Drying. Service? The best! Your orders receive our prompt attention—whether they be for gallons or drums. Write for samples and prices, today!

Remember, Ferro Is Set Up to Provide Complete Organic Coatings Service. From the Development of Specialized Coatings to Designing and Installing Efficient Finishing Oven Systems.

FERRO ENAMEL CORPORATION
LIQUID PLASTICS DIVISION
4150 East 56th Street • Cleveland 5, Ohio

Vedoc

over by **GEORGE M. DeCAMP** and **EVERETT H. JENKS,** both of the Company's New England sales force.

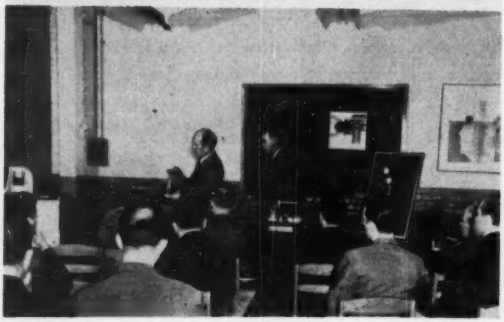
TRAINING COURSES

At the **BINKS MANUFACTURING COMPANY,** Chicago, registration for winter classes in spray painting methods and spray finishing equipment is under way. Classes will be held from 9 a. m. to 4 p. m., Monday through Friday, on the following dates: January 8-13; February 5-9; and March 5-9.

William Beecham, well-known paint chemist and spray painting authority, is in charge of the classes, which are held in the Binks plant.

Students will be familiarized with the construction and operation of spray guns, extractors, compressors, and other related equipment. Each member of the class disassembles a spray gun and puts it together again. At the end of the week, all are thoroughly informed on the advantages and operation of spray guns, both manual and automatic. The practical operation of spray booths is also stressed.

No tuition is charged students of the Binks Spray Painting School. Application should be made two or more weeks in advance to E. F. Watts, Binks Manufacturing Co., 3118-40 Carroll Ave., Chicago 12, Illinois.



(Above) Mr. Beecham, a leading spray painting authority, explains the construction of a Binks spray gun. Other spray finishing equipment such as compressors is also studied.
(Below) Members of Binks Spray Painting classes are shown the correct methods of using spray guns and other finishing equipment.

SOCIETIES

The **ANNUAL EDUCATIONAL SESSION** and **PARTY** held by the **CHICAGO BRANCH** of the **AMERICAN ELECTROPLATERS' SOCIETY** is scheduled for Saturday, January 27, 1951, at the Hotel Stevens, Chicago.

The educational portion of the program, which begins promptly at 2 p.m., consists of a symposium on the subject, "The Preparation of Metals for Plating." The following speakers will discuss various aspects of the general subject:

C. F. Nixon, Ternstedt Division, G M C, Detroit, Mich., "Polishing and Buffing."

Dr. Foster D. Snell, Foster D. Snell, Inc., New York, N. Y., "Emulsion - Solvent - Alkaline Cleaning."

Dr. Cloyd C. Snavely, Battelle Memorial Institute, Columbus, Ohio, "Pickling and Bright Dipping."

The banquet and entertainment program is scheduled for 7:30 p.m. The banquet committee promises an excellent entertainment program. The following members of the Chicago Branch are in charge of this

HARSHAW
supplies Industry with

Electroplating Salts Anodes & Processes

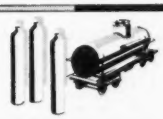
Synthetic Optical Crystals

Driers and Metal Soaps

Agricultural Chemicals

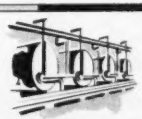
Ceramic Opacifiers and Colors

Chemical Commodities



Fluorides

Fungicides



Glycerine

Preformed Catalysts AND Catalytic Chemicals
FOR PETROLEUM AND OTHER ORGANIC PROCESSES

HARSHAW SCIENTIFIC
Supplies chemicals and apparatus for your laboratory.

HARSHAW

THE HARSHAW CHEMICAL CO. • CLEVELAND 6, OHIO
Cleveland • Chicago • Cincinnati • Detroit • Houston • Los Angeles • New York • Philadelphia • Pittsburgh

HARSHAW SCIENTIFIC DIVISION OF THE HARSHAW CHEMICAL CO. CLEVELAND 6, OHIO
Cleveland • Cincinnati • Detroit • Houston • Los Angeles • Philadelphia

year's banquet: Harold Smallman, Chairman; Rudy Hazucha, Co-chairman; J. M. Andrus, Educational Program; Ray F. Ledford, Publicity; Paul Glab, Ticket Sales Treasurer; Helge Gilbertson; Cyril Kocour; Clyde Kelly; Will Zinn; Marion Longfield; and Larry George.

Tickets may be obtained from Paul Glab, 882 N. Paulina St., Chicago 22, or any other member of the committee.

meetings

OF INTEREST TO FINISHERS

Dec. 16. Annual Christmas Party and Banquet, Newark Branch, American Electroplaters' Society, Hotel Robert Treat, Newark, New Jersey.

Jan. 15-18. Second Plant Maintenance Show and Conference, Auditorium, Cleveland, Ohio.

Jan. 27. Annual Educational Meeting and Party, Chicago Branch, American Electroplaters' Society, Stevens Hotel, Chicago, Illinois.

Mar. 5-9. Spring Meeting and Committee Week, American Society for Testing Materials, Cincinnati, Ohio.

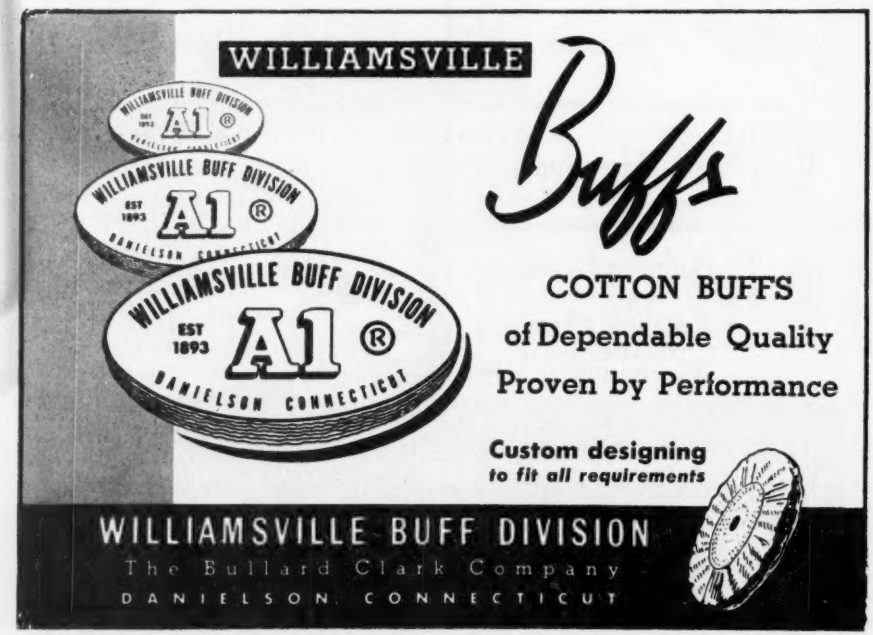
Mar. 13-16. 1951 Conference and Exhibition, National Association of Corrosion Engineers, Statler Hotel, New York, New York.

Apr. 7. Annual Technical Session and Banquet, Boston Branch, American Electroplaters' Society, Hotel Statler, Boston, Massachusetts.

June 25-28. 38th Annual Convention, American Electroplaters' Society, Hotel Biltmore, Los Angeles, California.

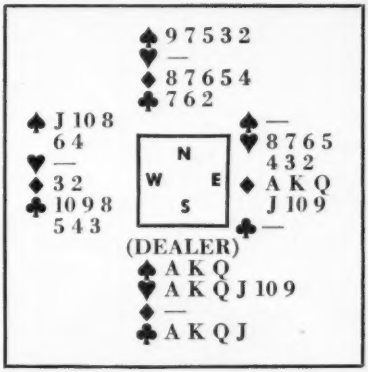
NECROLOGY

LLOYD N. LANGDON, Chicago district manager for Pyroxylin Products, Inc., died suddenly of a heart attack at his home on November 12.



It's a Fooler

If you play bridge you've probably met some version of the Tennessee Heart hand. Good as the South hand looks, it can't even make a one heart bid. Try it and see.

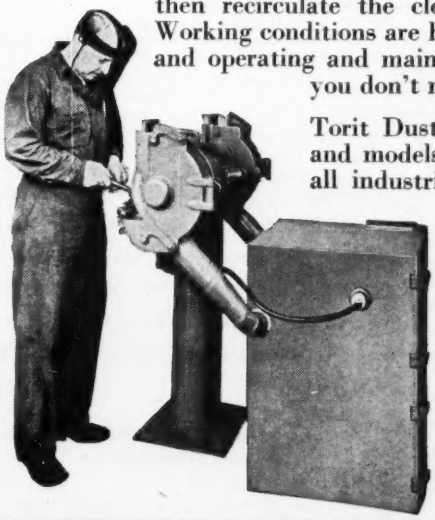


There's no fooling when

TORIT DUST COLLECTORS

go after dust in your plant

You score a grand slam when you equip cutoff, grinding and polishing machines with Torit Dust Collectors. Easily installed, without upsetting production layouts, they capture dusts, filter and then recirculate the cleaned air back into the room. Working conditions are bettered, there are no heat losses, and operating and maintenance costs are very low . . . you don't miss a trick.



Torit Dust Collectors come in many sizes and models. They are adaptable to nearly all industrial operations. So, if you have a dust problem, put in your bid to:

TORIT

Manufacturing Co.

314 Walnut St. • St. Paul 2, Minn.

P. S. Also ask for the new Torit catalog

Finishes

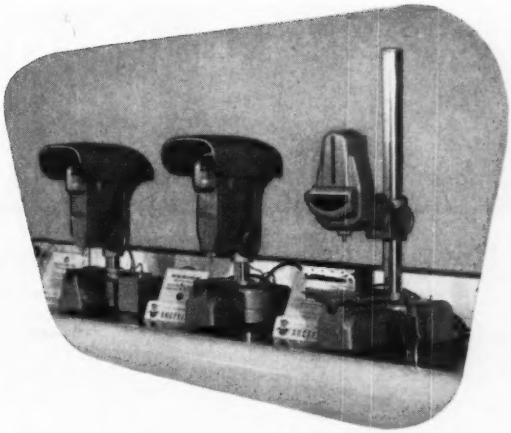
The die cast Zamak metal housing of the new Executone electronic intercommunication equipment line is given a prepaint chromic acid dip, and finished in Maas & Waldstein bronze Metalustre baking enamel.

(Photo courtesy Executone, Inc., New York 17, N. Y.)

The bowl of the Bradley Duo-Washfountain is fabricated from 14-gauge steel and coated with acid resisting procelain enamel. The pedestal panels are phosphatized, sprayed with a gray primer, and finished with a spray coat of white enamel, baked on at 375 deg. Fahrenheit.

(Photo courtesy Bradley Washfountain Co., Milwaukee 1, Wis.)

that aid in appearance and utility

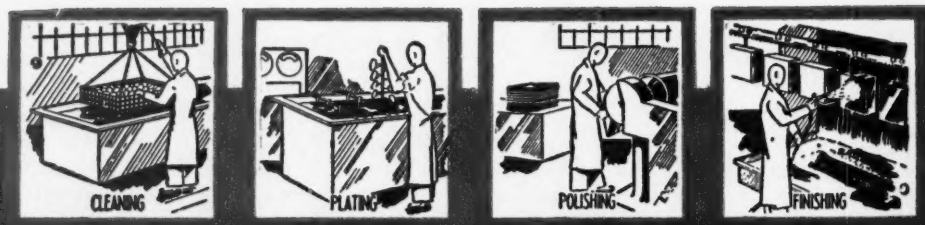


Sheffield gages here illustrated are finished in a Kay & Ess hammer-type "Mother-of-Pearl" baked finish.

(Photo courtesy Kay & Ess Company, Dayton 1, Ohio)

The URC-4 air-sea rescue transmitter-receiver, designed and developed by the USAF Air Materiel Command's Communication and Navigation Laboratory, Wright Field, and manufactured by the Hoffman Radio Corp., Los Angeles, Calif., is finished in yellow-chrome synthetic baking enamel (Army-Navy Distress Yellow) and polished chromium. The case is finished in the yellow-orange enamel; one side of the case is covered with an instruction name plate lithographed in four colors on a yellow-orange background; the cover is highly polished chromium plate, so that the reflecting surface can be used for distress signaling; switches and switch buttons are chromium plated.

(Photo courtesy Air Materiel Command, Wright-Patterson Air Force Base, Dayton, Ohio)



New • EQUIPMENT • MATERIALS • PROCESSES

H-VW-M No. 4-S-10

Hanson-Van Winkle-Munning Company Matawan, N. J., has developed a water dispersible buffing and coloring composition, designated as No. 4-S-10, which is a general purpose material for color buffing all non-ferrous metals except nickel.

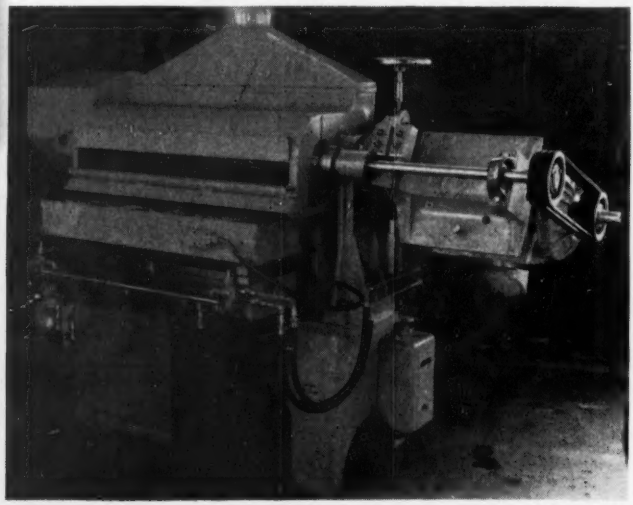
The composition is said to be easy to clean in aqueous solutions, using a mild alkaline cleaner with or without current. It is especially useful in work with deep filigrees which tend to trap composition into tight, hard masses.

Model 206 Surface Finishing Machine

A special purpose, single-spindle surface finishing machine has been announced by the Clair Manufacturing Co., 1010 S. Union St., Olean, N. Y. Developed in conjunction with hand tool manufacturers, the Model 206 can be equipped for either mechanical or magnetic holding.

Particularly recommended for applications where requirements approach a precision grind operation, it is suitable for a wide variety of small metal products, the manufacturer states.

Actuated by an electro - hydraulic system, the Clair Surface Finishing Machine uses a single spindle upon which a roll 40 inches wide may be mounted. Automatic hydraulic "in" and "out" stroke is adjustable from 0 to 24 inches, with a maximum holding and working area of 24 x 38 inches. An air circuit provides float



Model 206 Surface Finishing Machine

of buff at any predetermined uniform pressure.

This unit is claimed to be a close approach to a precision grinder as well as an extremely versatile contour finisher.

Anodes for Electrotinning

Metal & Thermit Corp., 100 E. 42nd St., New York 17, N. Y., announces that it is now producing tin and tin alloy anodes for use in the electroplating of tin and for the new tin-zinc plating process.

Three types of anodes are available: pure tin anodes, high speed alloy tin anodes which provide increased efficiency in tin plating, and tin-zinc anodes which are used for depositing a tin-zinc alloy.

Enthone Inhibitor 8

Enhone, Inc., Dept. PF, 442 Elm St., New Haven, Conn., has announced an inhibitor, designated as Enthone Inhibitor 8, which possesses the advantages of high inhibiting action in many types of mineral acids including hydrochloric, sulfuric and phosphoric acids, lack of odor, complete miscibility with pickling solutions, and ease of handling.

In addition to the high inhibiting action with its advantages for saving of acid, lowered attack on metal, and brighter pickling, the inhibitor lowers the surface tension of the pickling solution, which results in smaller pendant drops and acid films remaining on the work after pickling, reducing the drag-out from 10 to 30 per cent, depending upon the shape of the article. This saving in drag-out also is said to be important because less acid is dragged into the lime solution that is normally used to neutralize the acid. The inhibitor does not increase hydrogen embrittlement of steel during pickling, it is stated.

The amount of inhibitor required is relatively low, being of the order of 0.1 to 0.2 per cent by volume of the acid mixture, or from 1 to 2 gallons per thousand gallons of acid solution. In case an excess of inhibitor is added, there is no danger of the formation of floating films to contaminate the work, and, in addition, Inhibitor 8 has high tolerance to ferrous sulfate, it is claimed.

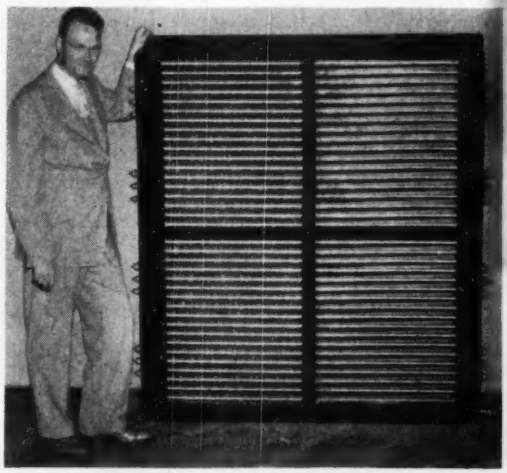
Chromalox Air Blast Heaters

Electric heating of extremely large volumes of air for comfort and processing is possible with a series of Chromalox air blast heaters developed by Edwin L. Wiegand Co., 7552 Thomas Blvd., Pittsburgh 8, Pennsylvania.

Individual Chromalox Finstrip heaters are assembled in banks to form sections of various sizes which are welded in one large frame for mounting in air ducts. The heaters have Monel sheaths and fins to prevent corrosion caused by moisture in the air passing through the ducts. All metal parts of the frame are primed with a rust-preventive undercoating before painting with a black, baked-on heat-resistant enamel.

W. J. Arnold, industrial sales manager, is shown in the photo with one of the heaters rated at 440 volts, 192 kw. The heater is composed of four separate removable quadrants of 48 kw. each with operation flexibility provided by eight distinct circuits for stepped modulation. The complete heater can be wired for infinite control to as low as 10 per cent of the full rated capacity.

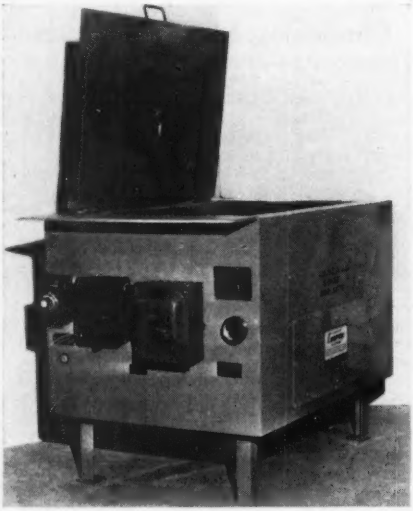
Provisions for thermal cut-out and thermostatic controls can be made in the fabrication of the heaters.



Chromalox Air Blast Heater

Wax Dipping Tanks

D. C. Cooper Co., 1467 S. Michigan Ave., Chicago 5, Ill., has announced a complete line of Electric Wax Heating Tanks, approved by Underwriters Laboratories for safely and accurately heating wax, rust preventives, oil, grease, and similar compounds.



Electric Wax Dipping Tank

Electric heating elements are so placed to prevent exposure to liquids. Automatic thermostatic control and 3-inch dial stainless steel stem thermometer assure accurate temperature control, preventing overheating and scorching of compound.

An automatic fusible closing device is attached to the cover to hold the cover open when in use and automatically close it in case of fire.

The tanks are furnished in sizes ranging from 5 to 1000 gallons, and can be equipped with special automatic timers.

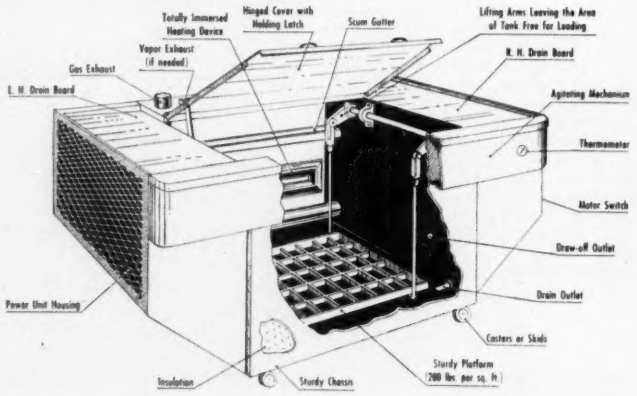
Magnus Aja-Dip Chip Removing Machine

The Magnus Aja-Dip Chip Removing Machine, product of the Magnus Chemical Co., Inc., Equipment Div., Garwood, N. J., has been announced for use in metal-working plants for the removal of metal chips and light oil from machined parts.

In the Magnus Aja-Dip Chip Removing Machine the batches of parts are vigorously agitated up and down through the cleaning solution 54 times a minute. At each up and down stroke the solution is put in turbulent motion, swishing through the parts at each change of the stroke. As the solution rushes back and forth against and through the parts, it scrubs the parts and removes metal chips, oil and dirt even down in the center of the load.

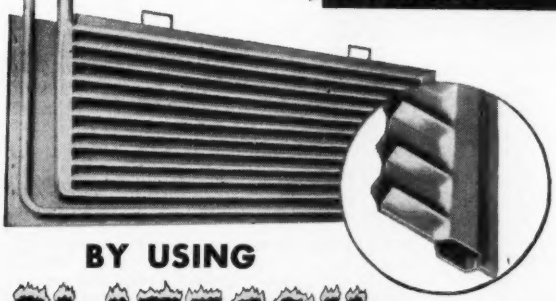
The chip removing job is fully automatic, requiring only manual loading and unloading of the machine—a one-man operation.

The unit is available in several sizes, handling from 75 to 10,000 pounds of parts per batch, and requires little floor space. Hot or cold cleaning solutions can be used; the machine can be heated by gas, steam, fuel oil, kerosene, or electricity.



Cutaway view of the Magnus Aja-Dip Chip Removing Machine

YOU SAVE STEEL MANHOURS MONEY



BY USING PLATECOIL FOR TANK HEATING AND COOLING

YOU SAVE CRITICAL STEEL because "Platecoils" require less than ½ the steel used in pipe coils of the same surface area. A 22" x 119" Platecoil weighs 95 lbs. against 239 lbs. for an equivalent 2" pipe coil. 144 lbs. steel saved. YOU SAVE CRITICAL MANHOURS because "Platecoils" are easily installed, cleaned or replaced in minutes . . . No down-time . . . No tank dumping. Many manhours saved.
YOU SAVE MONEY because "Platecoils" cost up to 50% less in initial cost and require less maintenance. Investigate "Platecoils" today.

Send for complete technical manual and descriptive Bulletin No. P50

PLATECOIL
Division
KOLD-HOLD MFG. CO.
LANSING 4, MICHIGAN

Why Platecoils Cost Less

LOW FIRST COST

The initial cost of Platecoil is often 50% or more below the cost of equivalent pipe coil depending, of course, on the materials used in construction.

EASY INSTALLATION

By the use of "quick change hangers" Platecoil installations can be made in open tanks in one-half hour or less by one man and a helper.

NO THREADED JOINTS IN TANK

The entire Platecoil is electric welded and pressure tested. There are no joints to corrode or leak. Both connections to the Platecoil can be located above the liquid level where there is no danger of thread corroding and freezing.

GREATER TANK CAPACITY

A 22" x 47" Platecoil gives the same heat transfer surface as 32 feet of 1½" pipe. This pipe requires a space approximately 30" x 60". Platecoil thus saves about 50% over equivalent pipe coil.

WEIGHS 50% LESS

Weighing only about half as much as equivalent pipe coil, Platecoil is easy to handle. A whole maintenance crew is not needed to transport and install Pipecoil.

TANK MAINTENANCE WITHOUT LOSS OF SOLUTION

There is no need for workmen to get inside the tank in order to make replacements or repairs. A Platecoil can be removed in a matter of minutes with the solution still in the tank.

LITERATURE

The new Platecoil Bulletin furnishes a complete description of the Platecoil method of tank heating. Write for your copy today.

HIGH BTU TRANSFER

More prime surface of Platecoil can be installed in a given area than can be obtained with pipe coil. Thus a more compact Platecoil unit provides much greater BTU transfer per unit area than can be obtained with pipe coil. Quick starts in heating tank solutions mean more hours of productive time.

Kold-Hold Manufacturing Company, Lansing 4, Michigan

"Ateen-Ate" Process

A method of applying permanent markings and designs on stainless steel has been developed by Stainless Ornamentals, Inc., 12 Harcourt St., Boston, Mass. In the process called "Ateen-Ate," blackened stainless steel is treated to produce permanent black designs or markings in contrast to the lustrous surface of stainless. The blackened areas are actually part of the stainless steel surface; no foreign matter is applied to the stainless steel. The blackened portions are claimed to have anti-corrosive qualities equal to stainless steel.

The company uses Armco Stainless Steel in its process and claims that potential uses for the marking process are practically unlimited. A recommended application is to put easy-to-read markings on dials, signs, name plates and instruments. As the process handles up to 132-screen halftones even photographs can be reproduced on stainless steel.

Architects, according to the company, also will find the process useful. Contrasting black markings and designs can be used to improve the appearance of stainless steel curtain walls, elevator trim, store fronts, decorative moldings, marquees, and doors. Other uses for permanently marked stainless steel are highway signs, bridge markers, tablet markers, and memorials where permanence and resistance to corrosion are necessary.

Since the black markings are part of the stainless surface, unlike other types of markings, they will not chip, peel, or crack. In addition, having a corrosion resistance equal to stainless steel, the blackened characters and designs will resist the effects of heat, weather, moisture, and abrasion, the manufacturer states. Further advantages of the process are that the blackened designs can be applied to flat or irregular surfaces and to either large or small areas.

USE OUR

Technical Consulting Service

HARRISON & COMPANY, INC.

Twenty-Seven Years of

SERVICE — QUALITY — PRICE

4A

For Free Technical Consulting Service, pertaining to Polishing and Buffing . . .

Write for complete information.

A Complete Line of Compounds Tailor-made to suit your particular requirements.

HARRISON & COMPANY, INC.

HAVERHILL, MASSACHUSETTS

Chemical Process Equipment

A line of chemical process equipment, made of synthetic resins and designed to meet stringent corrosion resistance requirements, is now being manufactured by the General Ceramics and Steatite Corp., Keasby, N. J. Known as Kemplas, the equipment is made of modified phenolic resins developed and produced by the Pennsylvania Salt Manufacturing Company after 17 years of research and prolonged tests under severe corrosion conditions in Pennsalt's plants and others.

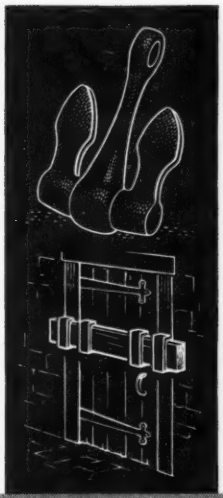
The resins are either cold cast or laminated with glass cloth and molded into desired shapes. In addition to being highly resistant to many types of corrosion, the equipment has the further advantages of being very lightweight and yet stronger than many construction materials normally used in such equipment.

The cold cast resins are particularly suitable to form strong, dense castings where tensile strength is not an important factor such as in pump volutes, impellers and some pipe fittings. Cast pieces can be machined and threaded in the field and, during installation, can be joined to one another by cementing with the same resin as the parent pieces.

Laminated pieces and equipment are used where extra strength for support is required or under conditions of shock. The extremely strong structure of the base fabric, combined with the bonding power of the resin, produces a material which has strength, both tensile and impact, approaching that of metals.

Kemplas resins are completely stable up to 370 deg. F. Equipment made of the material is capable of withstanding all atmospheric conditions and can operate under a wide range of temperatures without being subject to thermal shock, the manufacturer states.

An anchor



for paint . . .

a bar *against rust . . .*

BONDERITE *belongs*

under the finish of fine painted metal products

The enemies of paint begin to work as soon as your product leaves your plant. Moisture, abrasion, scratches and dents injure the paint film and lay the metal bare. The finish on untreated metal will quickly deteriorate.

On Bonderite-treated metal the paint is anchored by the crystalline phosphate coating, integral with the metal. Because it's non-metallic, Bonderite resists rust and corrosion, confines finish damage from scratches to the injury itself. Bonderite-treated products *look better longer.*

Bonderite is the *standard* corrosion resistant paint base. It's used on thousands of painted metal products. Learn how it can help make *your* product better. Write today.

PROTECTED BY Bonderite QUALITY CORROSION RESISTANT

Bonderite, Parco, Parco Lubrite—Reg. U. S. Pat. Off.

PARKER

PARKER RUST PROOF COMPANY
2172 East Milwaukee Ave.
Detroit 11, Michigan

BONDERITE—Corrosion Resistant Paint Base • PARCO COMPOUND—Rust Resistant • PARCO LUBRITE—Wear Resistant for Friction Surfaces

Detrex PRD

Detrex PRD, a light-colored semi-liquid material that is used for facilitating maintenance of walls on both wet and dry spray booths, is a product of the Detrex Corp., Box 501, Detroit 32, Mich. It has characteristics making it especially advantageous to use on dry booths. It is readily thinned with water to any consistency for use in spray equipment.

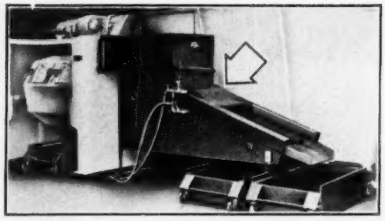
When dry, Detrex PRD forms a continuous non-transparent soft white coating. This coating is readily removed by scraping, or may be washed off with either hot or cold water under pressure. Paint adhering in a solid film can be peeled off in a sheet, scraped off, or washed off. Regular overspray paint is easily removed by any of these methods.

Detrex PRD can be brushed on as it comes, although a 10 per cent dilution with water usually provides a better consistency. For spraying, a 20 per cent dilution (4 parts Detrex PRD to 1 part water) will produce a viscosity that can be handled in a pressure tank. When too thin a spraying consistency is used, running will occur before coverage is obtained. As heavy a coating as possible should be applied in all cases.

Mecha-Finish Stationary Separator

An efficient time and labor-saving facility for mechanical finishing (tumbling) to aid in separating parts from the abrasive and screening abrasive chips to a size is now available from the Mecha-Finish Corp., Dept. PF, P. O. Box 308, Sturgis, Mich. Known as the Mecha-Finish Stationary Separator, its use reduces down time to a few minutes.

The photograph illustrates how the separator is used. A hoist pan of parts and chips is emptied into the hopper of the unit, and with the correct screen installed, the abrasive is caught in a hoist pan beneath the unit and the parts in a basket or container at the end of the machine. Flushing facilities to clean the parts and abrasive are incorporated in the separator. Screens can be changed easily, and their oscillation or travel and agitation are controlled, the manufacturer states.



Mecha-Finish Stationary Separator

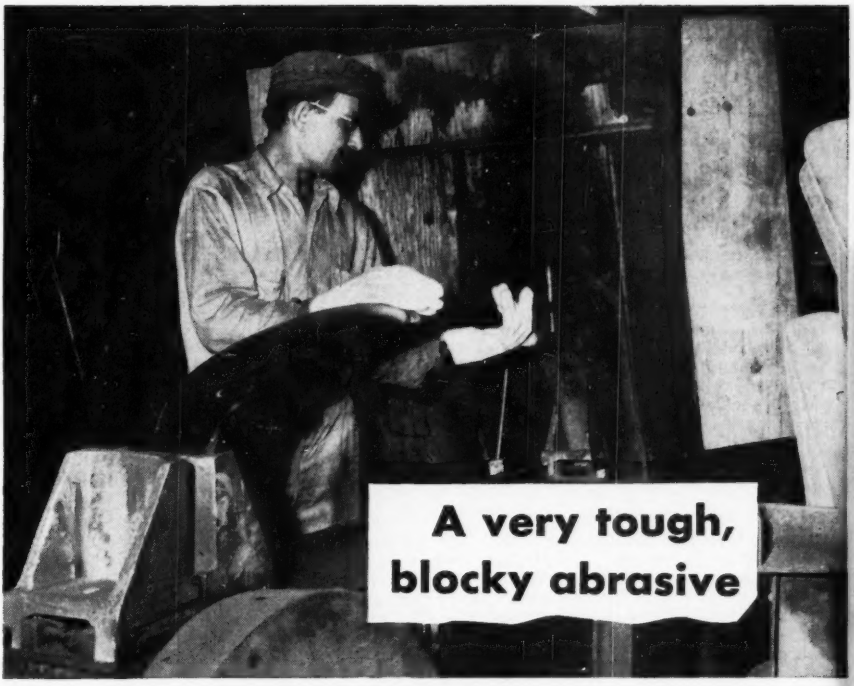
Fast-Drying Plastic Synthetic Finish

A clear, fast-drying plastic synthetic finish, Base VC-38, designed particularly for use on trim and hardware made of brass and other metals, has been developed by the United Lacquer Manufacturing Corp., 1001 W. Elizabeth Ave., Linden 8, N. Y. It may be used with good results on iron, copper, gold, cadmium, chromium and nickel, in addition to brass, may be tinted to give a gold or brass appearance to steel or aluminum.

Field tests have shown that Base VC-38 gives metal items excellent durability and resistance to perspiration, handling, marring and tarnish, and will be particularly useful for finishing door knobs, trunk locks, handles, escutcheon plates, and other metal trim.

Chief advantage of the finish is its fast drying time, the company states. It will air dry sufficiently to handle in about 30 minutes and will air dry hard overnight. When baked for 10 minutes at between 200 and 250 deg. F. in a gas oven or under infra-red lights, it will dry hard in 10 minutes.

The finish may be applied by the dip or spray process, and is available in either a satin or flat finish. A special thinner, Base VT-39, has been prepared to reduce Base VC-38.



ALOXITE TP Grain

Proved in hundreds of applications where fast cutting of hard metals is desired, ALOXITE TP aluminum oxide grain gives outstanding service in such volume production as polishing bumpers. ALOXITE TP grain is tough and blocky —flats and splinters have been removed to gain highest efficiency. Intense chemical treatment during manufacture assures maximum adhesion with cold cement or hot glue. Recommended for polishing all types of steel and other high tensile strength metals; all standard grit sizes from 16 to 220. Write for special booklet on metal polishing with grain, or ask your CARBORUNDUM representative. The Carborundum Company, Bonded Products and Abrasive Grain Division, Niagara Falls, New York.

POLISHING GRAIN by

CARBORUNDUM

TRADE MARK

"Carborundum" and "Aloxite" are registered trademarks which indicate manufacture by The Carborundum Company

"Strip-Aid"

"Strip-Aid," produced by Klem Chemicals, Inc., 14403 Lanson, Dearborn, Mich., is a compound which, added in small quantities to alkaline type paint strippers, speeds the action of the strippers. It is used one part to ten parts commercial stripper (by weight). Stripping procedure consists of normal immersion followed by a simple hot water rinse.

Non-flammable, non-toxic, and non-injurious to hands and clothing, Strip-Aid may be used on any ferrous metal. According to the manufacturer, it has been found most effective in the stripping of modified alkyd paints commonly used in finishing household appliances, automobile interior trim, and so on, and is also extremely successful on nitrocellulose lacquers.

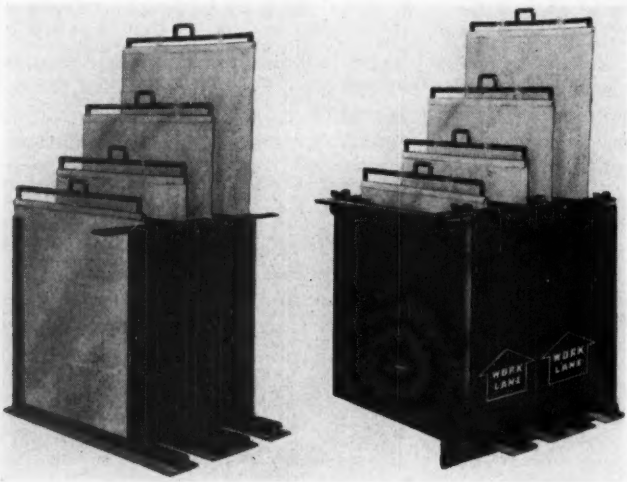
Diaphragm Plating Converter Sections

Automotive Rubber Co., Inc., 8601 Epworth Blvd., Detroit 4, Mich., has brought out a unit which converts existing plating tanks to the diaphragm type operation. Manufacturer of special diaphragm equipment, the company has designed a conversion unit which can be installed in plating tanks where the size of the work permits.

Diaphragm plating provides for the separation of anode and cathode compartments by means of canvas duck screens. The object is to produce smother plated surfaces, allow higher current densities, and eliminate polarization. The anode solution is pumped off, filtered, and passed on to the cathode compartment free of insoluble metallics and organics which form at the anode and deposit on the work pieces.

The Automotive Rubber Company conversion unit consists of fabric sleeves that slide on rubber insulated metal frames, which in turn slide into insulated channels with the cathode side or work lane protected by insulated woven wire guards.

Diaphragm converter sections can be constructed for tanks of any width or length with single or multiple work lanes.



Diaphragm Plating Converter Sections ready for installation (left), and installed in a tank section (right).

Ion Exchange Demineralizer

The Penfield Manufacturing Co., Inc., 19 High School Ave., Meriden, Conn., has announced the availability of its Ion Exchange Demineralizer for laboratories and other users of up to 10 gallons per hour of high purity, demineralized water.

Designed to attach to any wall near a tap and requiring no heat or steam power for its operation, the demineralizer has a permanent cartridge and is equipped wtih an exclusive flow meter, a sight indicator that enables the operator to adjust flow intake to the proper rate for most efficient results.

Operating on the ion exchange principle of transforming tap water into demineralized water of exceptionally high purity, the permanent cartridge feature of the Penfield Demineralizer eliminates the necessity of purchasing new cart-

WHY DU-LITE IS RIGHT
for production black finishing of all steel parts . . . . . .

1 - Exclusively for ALL Parts of Steel . . .

Du-Lite was developed exclusively for the black oxidizing of steel. It has been perfected to do this *ONE* job superbly.

2 - A Lustrous Rust-Resistant Black . . .

Du-Lite produces a handsome, uniform, jet black finish — not a coating. Du-Lite becomes an integral part of the steel surface itself, and will not chip, peel, crack, or blister.

3 - Easy to Operate - Consistant Results . . .

The Du-Lite Process is trouble-free and results can be achieved consistantly without stoppages and slow downs.

4 - Reasonable in Cost . . . . . .

Du-Lite is inexpensive to install, and less costly to operate.

5 - Backed by Du-Lite's Service and Guarantee

Du-Lite's trained technical men will see that the process is properly installed and train your operators — your guarantee of steady production.

Investigate Du-Lite's NEW process for blackening Stainless Steel Parts and Malleable Iron Castings.

THE DU-LITE CHEMICAL CORPORATION

110 RIVER ROAD • MIDDLETOWN • CONN

ridges and screens when the resin charge needs replacing. All that is necessary is to remove the permanent cartridge, dump the exhausted resins, and refill with a fresh charge of Penex Mixed Bed Resins.

An electric conductivity meter built into the unit provides a continuous visual indication of the quality of the treated water being produced, warning when the resin charge should be renewed.

Plastiglov

Plastiglov, a plastic impregnated glove which is said to have excellent wear-resistant qualities, is being introduced by The American Rubberizing Co., Dept. PF, 617 11th Ave., S., Minneapolis, Minnesota.

Waterproof and snag-proof, the form-fitting Plastiglov is heat and flame resistant. It is also claimed superior in tensile and tear strength and in abrasion, acid, and alkali resistance. Tests have shown Plastiglov to withstand long exposures to corrosive materials without affecting the plastic impregnated coating.

Plastiglov

HOLLAND SAYS:
DEBURRING WILL CUT GRINDING COSTS
Motor Driven Tilting Tumbling Barrels for cleaning, polishing, grinding, deburring, sanding, burnishing and various other applications.
Wide selection of metal finishing equipment on hand. Write for FREE folder "M."
J. HOLLAND & SONS, INC.
MANUFACTURERS • DEALERS
276 SOUTH NINTH ST. • BROOKLYN, N.Y.

Plextone Finish

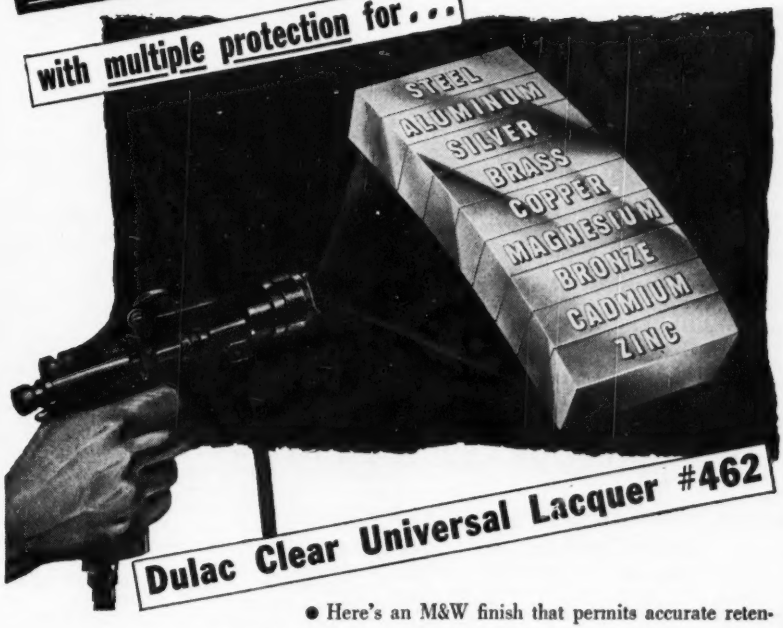
With the Plextone finish it is possible, in a single spray operation, to secure a multi-color finish on products and interiors according to Maas & Waldstein Co., Newark, N. J., and Chicago, Ill. On the finished surface, a single coat of Plextone appears as a network of interlaced but separate colors—a "Polka Dot" paint. Each color retains its own identity giving an overall textured-color effect simulating leather, cork, granite, marbles, and other multi-color materials.

A standard spray gun with a single pressure container is the only equipment needed to apply Plextone. Toughness, washability, and unusual hiding power are advantages claimed. Color effects are practically unlimited through the wide range of "Plextonized" solid colors which are readily mixed on the job, if desired to create unique blended finishes from a single pot of paint. Plextone finishes may be flat or glossy, or in combinations, giving glossy highlights on a flat background.

Zolatone, Inc., originator of Plextone, has appointed Maas & Waldstein Company sole manufacturer and distributor in the East and Midwest under license to produce this product under patents pending.

One Lacquer, so clear it's invisible,

with multiple protection for . . .



Dulac Clear Universal Lacquer #462

● Here's an M&W finish that permits accurate retention of all desirable surface qualities of most metals . . . that adds lasting protection against heat, cold, weather, corrosion, stain and perspiration — Dulac Clear Universal Lacquer #462. It's formulated to give good adhesion with either the spray, dip or brush method. And it fits into fast production schedules because in five to ten minutes this successful general purpose lacquer dries out of dust . . . hardens in one hour. For complete information, write for Technical Data Bulletin 110 or let an M&W technical consultant discuss your requirements privately with you.

PIONEERS IN PROTECTION
M.&W.Co. 1876

. . . where industry goes with finishing problems

MAAS & WALDSTEIN COMPANY

Newark 4, N. J. • Chicago 12, Ill. • Los Angeles 34, Calif.
Pacific Coast Division: SMITH-DAVIS CO., 10751 Venice Boulevard, Los Angeles 34
MANUFACTURERS OF INDUSTRIAL FINISHES

Miccroloid Primer

The Michigan Chrome & Chemical Co., 6340 E. Jefferson Ave., Detroit 7, Mich., has marketed Miccroloid Primer, a bonding method for all metal finishes.

Miccroloid Primer is a specially formulated primer, quick drying and flexible, which provides maximum adhesion on hard-to-stick-to metals such as brass, tin, lead, galvanized metal, zinc, steel, cadmium, magnesium, aluminum, and bronze.

Applied by spraying, dipping, or brushing, it protects metal before painting, forms insoluble phosphates at the metal surface, prevents corrosion from creeping beneath the paint film, and provides a corrosion-resistant anchor coat. Miccroloid Primer is also used as a prime coat to provide temporary protection for metals before painting; and as a metal surface-conditioning agent to replace conventional acid wash coats.

It is recommended to use as a standard primer, where conditions of extreme exposure are encountered on machinery, transformers, air-conditioning equipment, and so on.

Lacquer and Paint Heater for Small Batches

A highly efficient "cup-heater" has been made available for the spraying of lacquers and paints at elevated temperatures by Thermalcup, Inc., Dept. H-48, 10118 Detroit Ave., Cleveland 2, Ohio.

Write

Sulphur Products Co.

Greensburg 8, Pa.

for

"FREE"

Information on Copper Stripping

Thermalcup Lacquer Heater

This unit is known as the Thermalcup Lacquer Heater, and offers accurate temperature control for "hot spray" in small production work.

The heater is made of sturdy welded aluminum spinnings that will stand up under long and hard usage. Only a little larger than the standard 1-quart spray cup (7¾ x 4¾ inches), it weighs only 25 ounces. The standard Thermalcup will fit spray guns with a yoke cover. Also available are Thermalcups to fit current pressure guns.

A new type of heating element, developed specifically for the unit, distributes heat evenly throughout the material. The thermostat is designed to give long service. Accurate temperature settings at various levels are preset at the factory, and other special temperature settings are available to meet specific requirements. Working temperature is reached in 8 to 14 minutes, depending on thermostat setting, at which time the pilot light cuts off.

R-10-X Liquid Primer

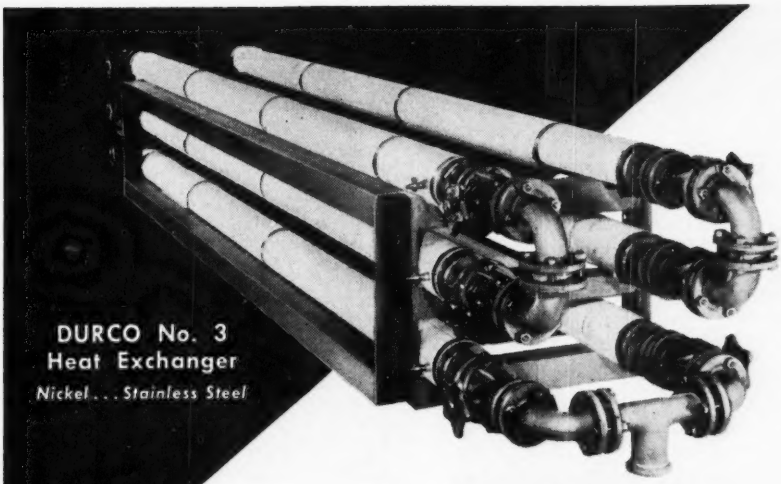
A liquid primer known as R-10-X is now being marketed by Thompson-Long Co., Dept. EJW, Board of Trade Bldg., Chi-

For a real good polishing job use

Keystone TURKISH Emery

FRESH SUPPLY AVAILABLE

KEYSTONE EMERY MILLS *Write for Sample* **4316 Paul St., Phila., Pa.**



Why this DURCO unit is crossing the "finish line" first

ADAPTABILITY. The problems of heating and cooling corrosives vary from plant to plant. So does the application of DURCO No. 3 Heat Exchangers. Tubes are Carpenter 20 (Durimet 20 analysis), nickel or type 316 stainless steel. These can be changed in the field if necessary. Units can be arranged in series or parallel or both, either horizontally or vertically, and employ standard flanged connections.

This and other DURCO Heat Exchangers are available as packaged units including DURCOPUMPS and DURCO Valves to meet specific flow and corrosion problems.

Write for Bulletin 1609 giving details on the DURCO No. 3 Heat Exchangers and for other information required.

THE DURIRON COMPANY, Inc.
Box 1019 • Dayton 1, Ohio

Industry's "Household Word" for Corrosion Resistance

DURCO
CORROSION RESISTING ALLOYS & EQUIPMENT

cago 4, Ill., as a rust destroyer that creates an ideal base for paint. A vital ingredient of R-10-X is selenium, a rare metallic element, which combines with ferric oxide (rust) by chemical action. The resulting compound known as Complex Iron Selenide dries quickly into an extremely hard, dense substance which is impervious to moisture and holds paint perfectly.

Possessing extraordinary penetrating ability, R-10-X attacks not merely the top of a coat of rust, but works all the way down into the metal's pores and neutralizes all the rust, the manufacturer claims. Also, because of extremely low surface tension, R-10-X has excellent spreading power.

R-10-X can be applied to rusted surfaces, without need to remove the rust, by brush or, for small areas, by wiping it on with a cloth.

PRODUCT LITERATURE

The publications listed in this section may be obtained free upon written request on company letterhead to the manufacturers concerned. Your courtesy in mentioning PRODUCTS FINISHING when requesting copies of these publications will be sincerely appreciated by the manufacturer and the publisher of this magazine.

"Triple Tested for Better Polishing" is the title of **Bulletin No. ESA-198** issued by the Simonds Abrasive Co., Tacony and Fraley Sts., Philadelphia 37, Pa., describing its Borolon aluminum oxide abrasive grain for polishing operations. The four-page bulletin contains abrasive grain size recommendations for typical polishing operations and includes detailed polishing wheel setup data.

Data Sheet No. 106, containing up-to-date information on the new tin-zinc plating process, may be obtained from the Metal & Thermit Corp., 100 E. 42nd St., New York 17, New York.

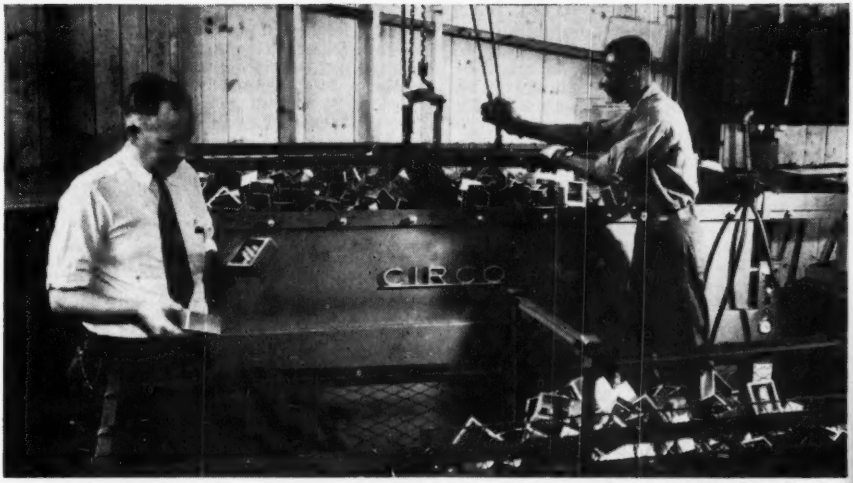
Enthone Inhibitor 8. A three-page bulletin has been announced by Enthone, Inc., Dept. PF, 442 Elm St., New Haven, Conn., on Enthone Inhibitor 8, a new type inhibitor for use with hydrochloric, sulfuric, phosphoric, and other mineral acids.

Metal Parts Cleaning Equipment. Vapor degreasers, metal parts washers, "spotless" dryers, solvent recovery stills, and pickling equipment are illustrated and described as to features and applications in a four-page folder available from the Optimus Equipment Co., 15 Water St., Matawan, New Jersey.

Sipes Paint Products. How to properly select and apply paint and paint products for industrial use is the subject of a 12-page booklet published by James B. Sipe and Co., Pittsburgh, Pa. Specifically written for users in the electrical manufacturing field, public utilities, steel fabricators, and industrial maintenance, the booklet contains complete information for application of primers and finishes to transformers, circuit breakers, transmission towers, as well as for the structural steel industry. Spreading rate, drying time, and methods of application are specified for each type of coating. Waterproofing and concrete sealing coatings, their application, and advantages are also discussed.

ALUMINUM PANELS
For
Testing Aircraft Finishes
now available
GARDNER LABORATORY, INC.
BETHESDA 14, MARYLAND

GOLD PLATING SOLUTIONS
In All Colors
Guaranteed 100% Pure Gold Content
Troy Weight - Color Constant
Tarnish Resistant
Proven Quality by the Acid Test
Write or call our experts about your plating problems
Davis-K-Products Co.
54 West 22nd St., New York 10, N. Y.
Oregon 5-0094
5-0095



Courtesy of Bud Radio, Inc.

Save—with Circo Vapor Degreasing

Circo vapor degreasing quickly and easily removes oil, grease and dirt from recesses and holes in even the most intricate parts. Circo degreasers handle all types of work—tiny screws or large iron castings—prior to finishing, inspection and assembly. High precision standards are safely met by Circo degreasers.

With a Circo degreaser, not only do you get better cleaning faster, but you are assured of operating economy. Its automatic control system holds solvent consumption to a minimum. Costly hand-labor operations are eliminated—savings of over 90% in time alone are common.

Send for our catalog of standard Circo degreasers. Our engineers will gladly work with you on unusual problems requiring equipment of special design. A-8302

Cut costs 3 ways:

1. Minimum solvent consumption.
2. Reduced man hours.
3. Better cleaning faster.

CIRCO PRODUCTS COMPANY
Metal Cleaning Equipment
6531 EUCLID AVE. • CLEVELAND, OHIO

PIONEERS IN THE DEVELOPMENT OF HOT VAPOR CLEANING EQUIPMENT

Detrex LPM Masking Compound, its advantages and applications in automotive and aircraft service shops are discussed in a six-page leaflet issued by the Detrex Corp., P. O. Box 501, Detroit 32, Michigan.

Dust-Free Tester. Design and operation, test data, and features of the New York Paint and Varnish Production Club Dust-Free Tester are given in an illustrated folder issued by Henry A. Gardner Laboratory, Inc., 4723 Elm St., Bethesda 14, Maryland.

Stevens Polishing and Buffing Compositions. A 12-page booklet which describes Stevens' many compositions for every metal surface and every polishing and buffing operation is available from Frederic B. Stevens, Inc., Detroit 16, Mich., or representatives of The Udylite Corporation. In addition, **Catalog No. 50** outlines Stevens' customer services as well as offers recommendations for the type of composition to use for each operation.

"Alcoa Library" is the title of a booklet published by Aluminum Company of America, Educational Service Section, 818 Gulf Bldg., Pittsburgh 19, Pa., which lists motion pictures, booklets, and visual aids produced by the company for distribution to educational institutions, students, and customers for aluminum. Profusely illustrated, the brochure reviews briefly the content of films and literature to help interested persons select material most helpful to their purpose.

Industrial Ovens, rod bakers, welding rod ovens, and furnaces are some of the equipment described and illustrated in **Bulletin 350,** issued by The Carl-Mayer Corp., 3030 Euclid Ave., Cleveland, Ohio. The two-color bulletin contains a number of installation photographs showing both conveyorized and batch-type ovens in use in manufacturing plants.

Laboratory Apparatus and Supplies. Burrell Corp., 2223 Fifth Ave., Pittsburgh 19, Pa., has announced its **Catalog No. 450,** an all-inclusive, up-to-date reference work on all kinds of laboratory apparatus and supplies. It lists over 25,000 items and includes many improved methods and aids for chemical analysis and testing. The catalog contains 986 pages plus index, weighs about 7 pounds, and is bound in durable green leather. Copies are available to laboratories of all kinds requesting them on company letterhead.

Temperature Control. In a 24-page manual, available to process engineers, plant managers, design engineers, and heating engineers, The Partlow Corp., New Hartford, N. Y., sets down the basic principles of industrial temperature control in extremely usable fashion. Entitled **"The Design and Process Engineer's Guide to Industrial Temperature Measurement and Control,"** the study defines the different types of control systems and distinguishes between them so that the engineer can logically select the particular type most appropriate to his situation. First described are the eight ways of responding to temperature, the five ways of putting that response to work, and the nine basic Partlow instrument types. Thereafter, the work devotes itself to relative evaluations of systems and the numerous important considerations of application engineering.

Liberally illustrated and highly organized for easy reference, the manual untangles many confusions which plague the heating engineer, and devotes clear chapters to the neglected subjects of the influence of the firing system upon the design of the control system, the fundamental tenets of mercury-bulb installation, and the basic concepts of electrical and mechanical control theory. Typical circuits and piping arrangements, and the matter of the ranges and calibrations of scales and dials are dealt with diagrammatically.

HARD and TOUGH

for TUMBLING

SIMONDS ABRASIVE CO.

Borolon Tumbling Abrasive is fused crystalline aluminum oxide, scientifically manufactured in Simonds own electric furnace plant at Arvida, Quebec, Canada. It removes flash and bead from stampings, puts a radius on small parts and gives a precision finish. Furnished graded to one size or run-of-mill sizes such as 6 to 12, 12 to 30, 30 to 60, etc. Also in lumps ¼" to ½", ½" to ¾", ¾" to 1" and 1" to 1½". Write for inspection samples and prices.

SIMONDS ABRASIVE CO., PHILA. 37, PA. • DISTRIBUTORS IN ALL PRINCIPAL CITIES

Interchemical Dry Thickness Gage. Characteristics of the unit, methods of use and application, together with prices, are presented in a four-page leaflet prepared by the Henry A. Gardner Laboratory, Inc., 4723 Elm St., Bethesda 14, Maryland.

Diaphragm Plating Converter Sections. A catalog sheet has been prepared by Automotive Rubber Co., Inc., 8601 Epworth Blvd., Detroit 4, Mich., which thoroughly describes the method for converting existing plating tanks to the diaphragm tank operation.

Chemically Resistant Coatings. Maurice A. Knight Co., Kelly Ave., Akron 6, Ohio, has available its eight-page two-color **Bulletin 3P** which lists the characteristics of Pyroflex Lacquer for acid and alkali proof coatings, typical uses, and methods of application.

Plextone Finish. a multi-color finish applied in a single spray operation, is the subject of several data sheets prepared by Mass & Waldstein Co., 438 Riverside Ave., Newark 4, New Jersey.

Anti-Corrosion Coating. Zincilate, a one-coat, self-protecting, anti-corrosion coating, is the subject of an eight-page illustrated technical bulletin published by Industrial Metal Protectives, Inc., 401 Homestead Ave., Dayton 8, Ohio. The bulletin presents case histories on outstanding companies and typical applications showing Zincilate's resistance to severe abrasive and corrosive conditions. Also listed are complete specifications for the two Zincilate formulations, data on surface preparation and methods of application, and an offer of providing process engineers to investigate corrosion problems and supervise applications.

Schaffner Catalog No. 51, available from the Schaffner Manufacturing Co., Inc., Schaffner Bldg., Emsworth, Pittsburgh 2, Pa., contains information on the latest methods for the use of polishing, buffing, and coloring compounds, as well as complete speed charts for buffing wheels. Other charts designate the proper composition to be used on the various metals to obtain the finish desired. This up-to-the-minute catalog is also a buffing and polishing consulting dictionary.

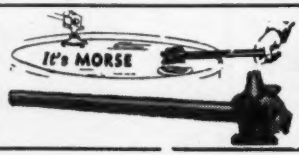
Pumps for Processing Industries. A full line of pumps for handling corrosive and non-corrosive liquids, solids - carrying liquids, and dry and semi-dry materials is presented in a 12-page, two-color, fully illustrated catalog issued by Yeomans Brothers Co., 1433 N. Dayton St., Chicago 22, Ill. A complete list of Yeomans distributors is included.

Palmer Automatic Drum Warmer, which warms anything in metal drums up to 400 deg. F., is the subject of an illustrated leaflet available from the Harold L. Palmer Co., 6432 Cass Ave., Detroit 2, Michigan.

Heli-Master Power Brushes. A four-page booklet describing its line of Helimaster power brushes is being offered by The Osborn Manufacturing Co., 5401 Hamilton Ave., Cleveland 14, Ohio.

The booklet features many photographs illustrating the design and use of the brush. Complete instructions for ordering and specifications for use are also included. Inserted in each booklet is an Application Data Sheet which can be filled out by a company having a cleaning, scrubbing, or finishing problem which could be solved by brushes. This sheet gives, in blueprint form, all the dimensions of a brush installation, and asks such questions as would pertain to the use of the brush, speed of machine, type of solutions used, and so on.

Send NOW for this FIT-ALL
DRUM PLUG WRENCH
Instantly loosens, tightens 95% all plugs or bungs in steel drums. Has 16" extra-strong steel tubing handle. Wgt. only 2 lbs. Order 1 or more today!



THOUSANDS IN USE saving time, labor, accidents!
SATISFACTION GUARANTEED... **$2.60**
Non-sparking type $4.00
Plus Parcel Post
MORSE MFG. CO., Inc.
125 Dickerson, Syracuse 2, N.Y.

Article Index, 1950

Aluminum

Aluminum—Its Surface Preparation and Finishing—E. R. Yarham Part 3 ..... Jan., p. 36
Amorphous Phosphate Coating for Aluminum Alloys ..... Jan., p. 60
New Seal Primer for Aircraft Finishing—Gilbert C. Close ..... Mar., p. 44
Aircraft Finishing Techniques Stress Utility—Gilbert C. Close ..... June, p. 56
Chemical Brightening of Aluminum ..... Aug., p. 84

Anodizing

Paint, Plating and Porcelain Protect and Beautify Display Cases—Ezra A. Blount ..... Feb., p. 12
Magnesium Processing and Finishing—Gilbert C. Close ..... Apr., p. 32
Aircraft Finishing Techniques Stress Utility—Gilbert C. Close ..... June, p. 56

Baking

Permanent Record of Oven Temperatures Obtained with Traveling Oven Thermometer ..... Jan., p. 83
Well-Planned Cleaning, Spray Painting, and Baking Setup Produces High-Quality Kitchen Cabinets—Ezra A. Blount ..... Mar., p. 14
Infra-Red Accomplishes Degreasing and Paint Baking on Single Conveyor ..... Mar., p. 82
More Rapid Paint Baking Accomplished in All-Metal Infra-Red Heater Installation ..... Apr., p. 80
Belt Polishing and Dip Finishing Door Chimes—William R. Cutter ..... July, p. 28
Overhead Electric Radiant Oven Aids Gasoline Engine Production ..... Dec., p. 68
Continuous Conveyor Makes Possible Efficient Cleaning, Dip Coating, and Baking of Folding Metal Chairs ..... Dec., p. 70

Base Metal

The Metal Under The Plate—Howard E. Boyer ..... Sept., p. 14
Determination of the Roughness of Metallic Surfaces ..... Sept., p. 88

Black Nickel Plating

Fine Watch Dials Demand Exacting Craftsmanship in Fabrication and Finishing—Theodore R. Schwalm ..... Jan., p. 21

Brushing

Fine Watch Dials Demand Exacting Craftsmanship in Fabrication and Finishing—Theodore R. Schwalm ..... Jan., p. 21
Power Brushing Used for Cleaning Shovel Blades ..... May, p. 89

Chromium Plating

Radioactive Tracers Used to Study Plating Process ..... Feb., p. 42
Processing Cycles for Chromium Plating—Jerome L. Bleiweis ..... May, p. 38
Passivity in Chromium Plating Operations ..... July, p. 70
Practical Notes on Decorative Chromium Plating—Jerome L. Bleiweis ..... Nov., p. 24

Cleaning

Preparation of High Carbon Steel for Plating ..... May, p. 84
Metal Cleaner Efficiency ..... Nov., p. 80
Molten Caustic Bath Provides Rapid, Efficient Method of Cleaning Steel Parts for Painting—James E. Fritts ..... Dec., p. 10
Finishing Beryllium Copper Parts ..... Dec., p. 58

Control

Tools of the Trade ..... June, p. 64
Recent Developments in Viscosity Control of Paint Finishes ..... Sept., p. 66
Uniformly Coated Electrolytic Tin Plate Assured by New Plating Thickness Meter ..... Oct., p. 20

Corrosion

Corrosion of Metals Underground ..... May, p. 18
Corrosion of Composite Electroplated Coatings ..... Oct., p. 44

Degreasing

Infra-Red Oven Removes Grease from Floor Furnace Parts ..... July, p. 74

Electropolishing

Electropolishing Brass on a Production Line Basis ..... Jan., p. 70

Enamel & Lacquer Application

How Yale & Towne Finishes Materials Handling Machinery—William F. Sorenson ..... Jan., p. 12
Fine Watch Dials Demand Exacting Craftsmanship in Fabrication and Finishing—Theodore R. Schwalm ..... Jan., p. 21
Aluminum—Its Surface Preparation and Finishing—E. R. Yarham Part 3 ..... Jan., p. 36
Color Lithography Process for Large Steel Drums ..... Sept., p. 46
Harmony in Grays for Industrial Equipment ..... Sept., p. 62
A Simple Semi-Automatic Laboratory Spraying Device—E. R. Mueller ..... Nov., p. 36
Continuous Conveyor Makes Possible Efficient Cleaning, Dip Coating, and Baking of Folding Metal Chairs ..... Dec., p. 70

Finishing Systems

How Yale & Towne Finishes Materials Handling Machinery—William F. Sorenson ..... Jan., p. 12
Three Complete Finishing Systems Combined to Speed Up Oliver Tractor Production ..... Jan., p. 84
Well-Planned Cleaning, Spray Painting, and Baking Setup Produces High-Quality Kitchen Cabinets—Ezra A. Blount ..... Mar., p. 14
Infra-Red Accomplishes Degreasing and Paint Baking on Single Conveyor ..... Mar., p. 82
Proper Paint Storage Can Aid Production—Gilbert C. Close ..... May, p. 12
Infra-Red Dries Porcelain Enamel Rapidly ..... May, p. 80
Conveyorized Setup Expedites IBM Finishing—Herbert Chase ..... Oct., p. 10
Conveyor System Speeds Cleaning, Spray Finishing, and Assembling of Cooling Fans ..... Oct., p. 66
Molten Caustic Bath Provides Rapid, Efficient Method of Cleaning Steel Parts for Painting—James E. Fritts ..... Dec., p. 10

Galvanizing

Developments in Galvanizing—F. G. White ..... May, p. 48
Galvanizing by the Sendzimir Process—K. Oganowski ..... Aug., p. 42

Industrial Research

Radioactive Tracers Used to Study Plating Process ..... Feb., p. 42
Gold From Industrial Waste Water ..... Mar., p. 52
New Pigment Dispersion Process Eliminates Mechanical Grinding, Milling ..... Apr., p. 40

Legal Aspects of Finishing

The Law and The Metal Finisher—Bryant W. Pocock
Part 1 ..... April, p. 26
Part 2 ..... May, p. 28

Magnesium

Magnesium Processing and Finishing—Gilbert C. Close ..... Apr., p. 32
Aircraft Finishing Techniques Stress Utility—Gilbert C. Close ..... June, p. 56

Masking Materials and Methods

Modern Masking Materials and Methods for Fabrication and Spray Finishing—Arthur P. Schulze
Part 1 ..... Aug., p. 20
Part 2 ..... Sept., p. 26
Part 3 ..... Oct., p. 26
Part 4 ..... Nov., p. 44

Metallic Coatings

Metal Coatings Formed by Methods Other Than Electrodeposition ..... May, p. 58
Protective Coating for Molybdenum ..... Dec., p. 60

Nickel Plating

Alloys of Phosphorus with Cobalt or Nickel ..... Aug., p. 32
Plating Without Nickel Chloride ..... Dec., p. 18

Organic Coatings

A Study of Heat Resisting Finishes—George Black ..... Feb., p. 38
New Seal Primer for Aircraft Finishing—Gilbert C. Close ..... Mar., p. 44
Trends and Developments in Organic Finishes ..... Apr., p. 42
Styrene Co-Polymers in Organic Finishes ..... Apr., p. 46
Lacquer-Type Cellulose Acetate Butyrates ..... Apr., p. 58
Combating Checking and Frosting in Organic Finishing Operations ..... May, p. 80
Aircraft Finishing Techniques Stress Utility—Gilbert C. Close ..... June, p. 56
Recent Developments in Primer Coatings ..... June, p. 100
Belt Polishing and Dip Finishing Door Chimes—William R. Cutter ..... July, p. 28
Factors Affecting the Adhesion of Organic Coatings ..... July, p. 50
Protective Coatings Under Conditions of Continuous Condensation ..... Aug., p. 90
Recent Developments in Viscosity Control of Paint Finishes ..... Sept., p. 66
Conveyorized Setup Expedites IBM Finishing—Herbert Chase ..... Oct., p. 10
High Temperature Heat Resistant Organic Coatings ..... Nov., p. 68
Reactions of Resins with Drying Oils Have An Important Effect on Finishes ..... Dec., p. 48

Paint Removal

Molten Caustic Bath Provides Rapid, Efficient Method of Cleaning Steel Parts for Painting—James E. Fritts ..... Dec., p. 10

Phosphatizing

Aluminum—Its Surface Preparation and Finishing—E. R. Yarham Part 3 ..... Jan., p. 36
Amorphous Phosphate Coating for Aluminum Alloys ..... Jan., p. 60

Pickling

High Speed Continuous Spray Pickling Machines Process Brass at New Scovill Continuous Strip Mill ..... Jan., p. 82
Acid Dips for High Carbon and Low Carbon Steel Prior to Electroplating ..... Apr., p. 52
Preparation of High Carbon Steel for Plating ..... May, p. 84

Plastic Coatings

Plastic Coating Protects Silver Plated Terminals and Armatures ..... Jan., p. 86
Aircraft Finishing Techniques Stress Utility—Gilbert C. Close ..... June, p. 56

Plating Research

Heat Treatment of Chromium Plate ..... Jan., p. 50
Alloys of Phosphorus with Cobalt or Nickel ..... Aug., p. 32

Plating Room Design

Diaphragm Tanks Promote Plating Progress—Ezra A. Blount ..... July, p. 12

Plating Solution Maintenance

Filter Out Your Plating Rejects—Ezra A. Blount ..... Dec., p. 24

Plating

Electroplated Metals in the Auto Industry—S. E. Sangster ..... Apr., p. 14
Progress in Electroplating Uncommon Metals and Alloys ..... Apr., p. 66
Suggestion Improves Finishing Process—Adjustable Cathode Support ..... June, p. 98
Diaphragm Tanks Promote Plating Progress—Ezra A. Blount ..... July, p. 12
Uniformly Coated Electrolytic Tin Plate Assured by New Plating Thickness Meter ..... Oct., p. 20
Palladium Plating Baths for Heavy Deposits ..... Oct., p. 60
Rhodium Plating Provides a Non-Tarnishing Finish ..... Dec., p. 56
Finishing Beryllium Copper Parts ..... Dec., p. 58

Polishing

Recent Developments in Metal Polishing ..... Feb., p. 74
Power Brushing Used for Cleaning Shovel Blades ..... May, p. 89
Belt Polishing and Dip Finishing Door Chimes—William R. Cutter ..... July, p. 28
Polishing and Finishing True Temper Products—N. J. Benton ..... Dec., p. 66
Suggestion Improves Finishing Process—Long Spindle Variable Speed Polishing Lathe ..... Dec., p. 76

Porcelain Enameling

Paint, Plating and Porcelain Protect and Beautify Display Cases—Ezra A. Blount ..... Feb., p. 12
Unique Conception of Job Enameling Plant—Walter Rudolph ..... Nov., p. 14

Safety

Safety Is No Accident ..... Nov., p. 62

Silver Plating

Fine Watch Dials Demand Exacting Craftsmanship in Fabrication and Finishing—Theodore R. Schwalm ..... Jan., p. 21

Solution Analysis

Tools of the Trade ..... June, p. 64

Spraying

Well-Planned Cleaning, Spray Painting, and Baking Setup Produces High-Quality Kitchen Cabinets—Ezra A. Blount ..... Mar., p. 14
Suggestion Improves Finishing Process—Redesigned Masking Form ..... Apr., p. 76
A Simple Semi-Automatic Laboratory Spraying Device—E. R. Mueller ..... Nov., p. 36

Suggestions

Redesigned Masking Form ..... Apr., p. 76
Adjustable Cathode Support ..... June, p. 98
Plating Racks ..... Sept., p. 44
Long Spindle Variable Speed Polishing Lathe ..... Dec., p. 76

Surface Conversion Coatings

Paint, Plating and Porcelain Protect and Beautify Display Cases—Ezra A. Blount ..... Feb., p. 12
Conversion Coatings on Zinc—Vincent Mattacotti ..... Feb., p. 52
Aircraft Finishing Techniques Stress Utility—Gilbert C. Close ..... June, p. 56
Chemical Brightening of Aluminum ..... Aug., p. 84

Testing

Surface Reproduction with Three-Dimensional Effect ..... Jan., p. 74
Factors to be Considered in Using Salt Spray Testing ..... Mar., p. 58
Determination of Traces of Zinc in Nickel Plating Baths ..... Apr., p. 74
Tools of the Trade ..... June, p. 64
Recent Developments in Viscosity Control of Paint Finishes ..... Sept., p. 66
Determination of the Roughness of Metallic Surfaces ..... Sept., p. 88
Adherence Tester May Be Useful in Evaluation and Formulation of Organic Finishes ..... Oct., p. 56

Tin Plating

An Improved Anode for Alkaline Tin Plating ..... Jan., p. 78
Paint, Plating and Porcelain Protect and Beautify Display Cases—Ezra A. Blount ..... Feb., p. 12
Tin Plate As Undercoat for Paint ..... Dec., p. 54

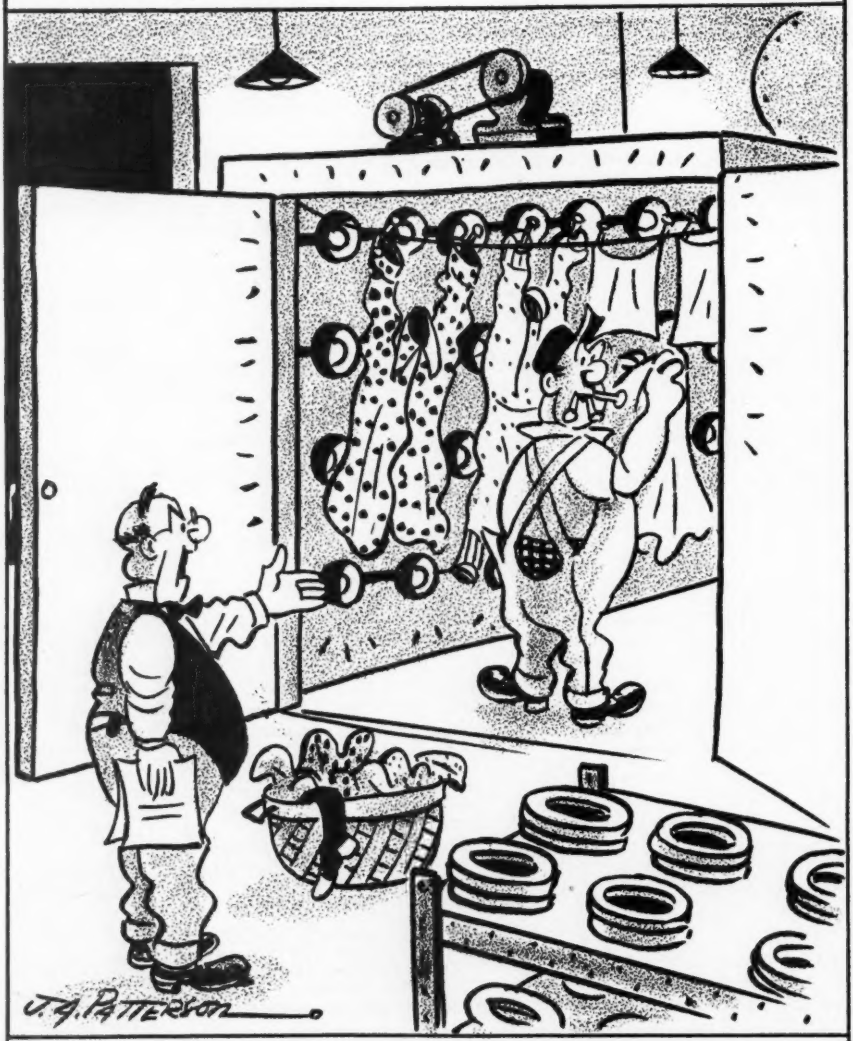
Waste Disposal

Stream Pollution and The Plating Industry—C. Fred Gurnham ..... Mar., p. 26
Practical Methods for Treatment of Plating Room Wastes ..... Aug., p. 68
Metal-Finishing Industries Join Ohio Valley Pollution Abatement Campaign—John E. Kinney ..... Sept.,p. 56

Zinc Plating

How Yale & Towne Finishes Materials Handling Machinery—William F. Sorenson ..... Jan., p. 12
Paint, Plating and Porcelain Protect and Beautify Display Cases—Ezra A. Blount ..... Feb., p. 12

The Finishing Touch — *By J. A. Patterson*



"See here, Westgate, I'm getting sick and tired of this every Monday morning!!"

Opportunity Section

NICKEL ANODES ... 10,000 lbs.

For Sale

Subject to prior sale

WRITE P. O. Box 291, UPPER DARBY, PA.

Do you have for sale a used Rectangular Automatic Buffing Machine? Chain type with quick change fixture holder platens equipped with standard manufactured polishing or buffing heads and necessary electrical control equipment. Please send all information to Box No. 121, c/o PRODUCTS FINISHING, 431 Main St., Cincinnati 2, Ohio.

FOR SALE

PLATING JOB SHOP—ESTABLISHED, COMPLETELY EQUIPPED

Located in a large Western New York State City.

Unusual opportunity to be in the plating business. Plenty of work on hand from good steady accounts and more available. Grossing annually $30,000. Stocked up on nickel, cadmium, zinc and all their salts; also on chromic acid and other supplies.

Approximate shop space 1600 sq. feet, including the plating, polishing-buffing and paint spraying departments. PRICE $21,000.

Thorough investigation welcomed.

Write Box No. 122, c/o PRODUCTS FINISHING, 431 Main St., Cincinnati 2, Ohio.

Complete

CHROME PLATING EQUIPMENT

Includes: tanks for acid dip, rinse, strip, reclean, reverse and plating; copper oxide rectifiers, amp. hr. meters; benches, etc. For complete details and specifications write purchasing department

K. O. LEE COMPANY

1110 First Ave. S.E. Aberdeen, S. D.

BOUGHT -- SOLD

NICKEL — CADMIUM — ZINC
(METALS — CHEMICALS)
CHROMIC ACID — CYANIDES
PHTHALIC ANHYDRIDE
PENTAERYTHRITOL
GLYCOLS—UREA
CHLORINATED SOLVENTS
Also Other Materials

CHEMICAL SERVICE CORP.

88-08 Beaver St., New York 5

Phone HAnover 2-6970

Cyclon Corrosion Resistant Materials of Construction. Munray Products Inc., Division of Poly-Cyclo Products Co., 12500 Crossburn Ave., Cleveland 11, Ohio, has published a folder containing technical data on many corrosion resistant materials for the processing industries. Among the standard products covered are industrial coatings, adhesives, process equipment linings, extrusions, chemical tubing and piping. Munray's engineering service is also described.

Luster-on Utility 15 Zinc Bright Dip is discussed as to features, characteristics, and operation in a leaflet distributed by The Chemical Corp., 54 Waltham Ave., Springfield 9, Massachusetts.

Mechanical Finishing. Equipment and materials for deburring and tumbling the Mecha-Finish Way are described and illustrated in a four-page leaflet available from the Mecha-Finish Corp., Dept. PF, P. O. Box 308, Sturgis, Michigan.

Catalogs

FOR YOUR LIBRARY

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

1. Industrial Equipment

Twelve-page liberally illustrated Catalog No. A-650, presenting its line of industrial equipment, including many modern units, can be obtained from The R. C. Mahon Co., Detroit 34, Michigan.

2. Heavy-Duty Cleaning Compound

A heavy-duty, alkaline cleaning compound developed for the cleaning of steel prior to vitreous enameling, Detrex 70, is described in a folder released by Detrex Corp., Detroit 32, Michigan.

3. Hot Spray Lacquering

A 20-page booklet containing a summary of the tests performed on the hot spray process in its laboratories can be obtained from the Hercules Powder Co., Cellulose Products Dept., Wilmington, Delaware.

4. Industrial Enamels

"Pittsburgh Standard Industrial Enamels" is the title of a color card issued by the Pittsburgh Plate Glass Co., Industrial Paint Div., Pittsburgh 22, Pa. The card contains color samples and recommendations for surface preparation and finish application.

5. Electroplating Tape

Physical and chemical properties of "Scotch" electroplating tape, general functions in electroplating, insulation protection, and application procedure for plating racks are contained in a data sheet published by the Minnesota Mining & Manufacturing Co., St. Paul 6, Minn.

6. Tank Heater

"Platecoil," a lightweight embossed plate for tank heating, is discussed as to installation, operation, features, and advantages in Bulletin P-50 released by the Kold-Hold Manufacturing Co., Lansing, Michigan.

7. Buffing and Polishing Compounds

A four-page pocket-size guide for purchasers of polishing and buffing compounds is available from the Mosher Co., Chicopee, Massachusetts.

8. Industrial Washing Machines

Factors to be considered in making a proper choice of equipment for thoroughly cleaning metal products are described in a 28-page book published by The Alvey-Ferguson Co., Cincinnati 9, Ohio.

9. Industrial Chemicals and Finishes

"Products of Atlas," a 20-page booklet released by the Atlas Powder Co., Wilmington 99, Del., lists and describes such items as industrial chemicals, industrial finishes, and activated carbons.

10. Metal Cleaning Guide

Oakite Products, Inc., New York, N. Y., has prepared a 44-page booklet which reviews metal cleaning in all its phases. Discussed are specific materials, equipment, and procedures for removal of fabricating operation soils, together with other information.

11. Buffs

A folder describing in detail the advantages of Jackson Airway Ventilated Buffs is available from the Jackson Buff Corp., Long Island City 1, New York.

12. Dust Control Systems

Young & Bertke Co., Cincinnati, Ohio, has prepared a booklet picturing and describing its method of solving the dust problems created in various industrial plants.

13. Pickling Inhibitor

A bulletin on Enthone Inhibitor 8, a new type inhibitor for use with hydrochloric, sulfuric, phosphoric, and other mineral acids is available from Enthone, Inc., New Haven, Connecticut.

14. Automatic Plating Machines

A 12-page booklet has been prepared by The Udylite Corp., Detroit, Mich., illustrating and describing the Udylite Full Automatics, single-row, double-row, overhead return-type, rotary and other models, as well as the Udylite Junior and the Udylite Semi-Automatic.

15. Synthetic Finish

"Dimenso," a synthetic finish that is designed to provide two colors in one spray operation, is described in a booklet now available from The Sherwin-Williams Co., Cleveland 1, Ohio.

16. Phosphate Coating Chemicals and Processes

Technical Service Data Sheet No. P-100-46 discussing its phosphate coating chemicals and processes for paint-bonding, rust proofing, protecting friction surfaces, and improving drawing and extrusion may be obtained from the American Chemical Paint Co., Ambler, Pennsylvania.

17. Infra-Red Ovens

How to step up efficiency in drying, baking, preheating, and dehydrating operations with the use of Jensen New Principle "Dual Heat" Infra-Red Ovens is the topic of a four-page catalog released by Jensen Specialties, Inc., Detroit, Michigan.

18. Spray Booths

Catalog 480 describing the Schmieg Centri-Merge Spray Booths for the elimination of paint overspray, with photographs and blueprint reproduction of typical plant installations, can be obtained from Schmieg Industries, Inc., Detroit, Michigan.

19. Industrial Ovens

The Kirk & Blum Manufacturing Co., Cincinnati 25, Ohio, has published a descriptive catalog showing installation views of its wide variety of industrial ovens in various types of plants.

20. Corrosion Resistant Coating

A descriptive folder containing specifications and application data on "Rust-Chek", a corrosion resistant product undercoat, is available from the Rinshed-Mason Co., Detroit 10, Michigan.

21. Metal Surface Preparation

The Parker Rust Proof Co., Detroit 11, Mich., has issued a catalog describing the Bonderizing process, as applied to steel, aluminum, zinc, die castings, and alloys, designed to preserve fine finishes by anchoring the applied paint film and retarding corrosion.

22. Spray Booth Maintenance

A folder outlining certain practices of spray booth maintenance with the various chemical products supplied for the purpose is available from the Crescent Chemical Corp., Perth Amboy, N. J. The products described include D-Zolvzit for water curtain paint spray booths, Booth Mask and E-Kon-O-Kote for spray booth masking purpose, and Float-Eez to assist in floating certain paints yet preventing adhesion on spray booth baffles.

23. Addition Agent

"Rocheltex," a liquid agent which can be added to any cyanide copper plating solution for use in any type of equipment, is the subject of Technical Data Sheet No. 5, released by MacDermid Inc., Waterbury 88, Connecticut.

24. Clear Lacquer

The Randolph Products Co., Carlstadt, N. J., has issued a folder which contains helpful, technical, and factual information on clear lacquer.

25. Air Compressors

Bulletin CK-101 providing full details on its 7½, 10, and 15 h.p., 4-cylinder "V" type air compressors can be obtained from The DeVilbiss Co., Toledo, Ohio.

26. Liquid Processing Equipment

Filters, mixers, pumps, tanks, and other standard units developed to meet the varying demands of customers are shown and described in a 24-page catalog prepared by the Alsop Engineering Co., Milldale, Connecticut.

27. Buffing and Polishing Compositions

Catalog No. 50, a 12-page brochure containing illustrations and data on its many polishing and buffing compositions, has been prepared by Fredric B. Stevens, Inc., Detroit 16, Michigan.

28. Solvent Vapor Degreasers

Blakeslee Solvent Vapor Degreasers, their operating characteristics, features, and advantages, are explained and illustrated in full detail in a 20-page booklet available from G. S. Blakeslee & Co., Chicago, Illinois.

PRODUCTS FINISHING
431 Main St., Cincinnati 2, Ohio

I am interested in receiving the following literature reviewed in your December issue.

No...... **No.**..... **No.**..... **No.**..... **No.**.....
(Insert numbers denoting literature you want)

Name ..... **Title**.....

Company .....

Company Address .....

City ..... **State**.....

Please print plainly in filling out coupon for literature.

INDEX TO ADVERTISEMENTS

Abbott Ball Co. 81
Acme Mfg. Co. 51
Alsop Engr. Corp. 52
American Chemical Paint Co. 53
Amersil Co., Inc. 92
Apothecaries Hall Co. 71

Bacon Felt Co. 42
Baker & Co., Inc. 6
Baughn Chemical Products Co. 70
Bede Products Inc. 63
Behr-Manning, Div. of Norton Co. 85
Better Finishes & Coatings, Inc. 50
Bias Buff & Wheel Co. 89
Blakeslee & Co., G. S. 7
Buffalo Forge Co. 41

Cambridge Wire Cloth Co. 91
Carborundum Co. 107
Chemco Products Co., Inc. 88
Circo Products Co. 115
Columbia Electric Mfg. Co. 38

Daniels Plating Barrel & Supply Co. 90
Darco Dept., Atlas Powder Co. 39
Davis-K-Products Co. 114
Despatch Oven Co. 57
Detrex Corp. ..... Fourth Cover
Detro Mfg. & Sales Co., Inc. 40
DeVilbiss Co. 44, 45
Du-Lite Chemical Corp. 109
Duriron Co., Inc. 113

Enthone, Inc. 19
Ferro Enamel Corp. 93
Fostoria Pressed Steel Corp. ..... Third Cover

Gardner Laboratory, Inc., Henry A. 114
Grav-I-Flo Corp. 55

Hammond Mchry. Builders, Inc. 87
Hanson-Van Winkle-Munning Co. 3
Harrison & Co., Inc. 104
Harshaw Chemical Co. 95
Hercules Powder Co. 22
Holland & Sons, Inc., J. 110
Hupp Corp., Globe Stamping Div. 83

Industrial Filter & Pump Mfg. Co. 62
Jensen Specialties, Inc. 49

Keystone Emery Mills 112
Kirk & Blum Mfg. Co. 61
Kold-Hold Co. 103

Lanly Co. 20
Lasalco, Inc. 4
Lowe Bros. Co. 46, 47

Maas & Waldstein Co. 111
MacDermid Inc. 73
Mahon Co., R. C. 64, 65
Morse Mfg. Co., Inc. 118

Norton Co. 2
Nu-Matic Grinders, Inc. 77

Oakite Products, Inc. 1

Parker Rust Proof Co. 105
Phillips Mfg. Co. 80
Pittsburgh Plate Glass Co., Brush Div. 23
Platers Research Corp. 106, 116

Quinn Co., Nelson J. 59

Randolph Products Co. 36
Robinson & Son, A. 37
Rockford Varnish Co. 8

Schaffner Mfg. Co. 60
Schmieg Industries ..... Second Cover
Sherwin-Williams Co. 69
Simonds Abrasive Co. 117
Stevens, Inc., Frederic B., Div. of Udylite Corp. 21
Striplastic Co. 84
Sulphur Products Co. 112

Torit Mfg. Co. 97

Udylite Corp. 17
U. S. Rubber Co. 18

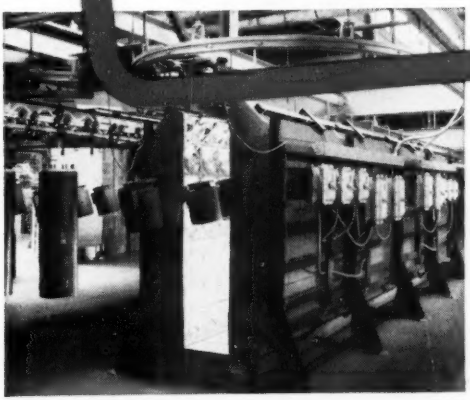
Varnish Products Co. 58

Wiegand Co., Edwin L. 43
Williamsville Buff Div. 96

Young & Bertke Co. 75

Get More Production Faster

Degreasing • Dry-off • Finish Baking in "Minutes" with Fostoria Infra-red



Experience of Over 6,000 Plants Proves Fostoria Superiority

- Lowest Unit Operating Cost
- Most Uniform Radiation
- Max. Temperature Range
- Max. Energy Utilization
- Greatest Flexibility
- Approved Electrical Construction

Listed by Underwriters' Laboratories, Inc.

Here is another example from the thousands of plants using Fostoria Infra-red Systems. The Permutit Co., N. J., now uses Fostoria Infra-red for two baking jobs in manufacturing water conditioners and softeners. Applications of a special coating on the inside of these products are baked at an actual temperature of 450°F for 29 minutes. Then a white prime and finish coat of enamel is baked on the exterior. Mr. J. O. Sherod, plant superintendent, states: "The ease of operation and the flexibility recommend this installation highly. The quality of the product from the oven is much better than that from our old steam heated ovens. From an overall operating standpoint, handling costs of material to and from the oven are lower." Fostoria Infra-red can do an outstanding job in your plant, too. May we show you?

GET FULL FACTS

Technical information and literature available on request. WRITE NOW. Learn how Fostoria Infra-red can aid your production.

fostoria

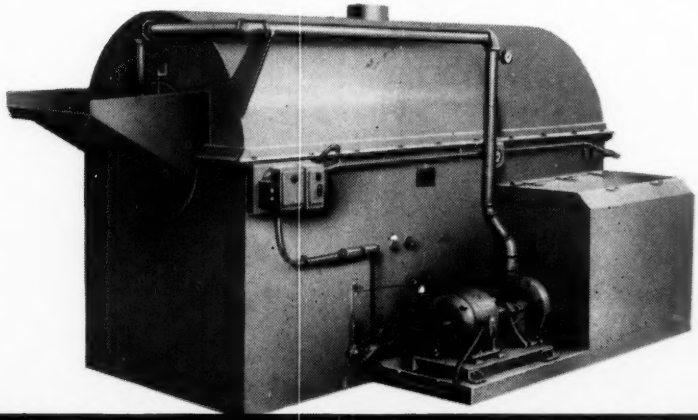
FOR BAKING • DRYING • PREHEATING • DEHYDRATING

Trade Mark Reg. U. S. Pat. Off

THE FOSTORIA PRESSED STEEL CORP., FOSTORIA, OHIO

Oldest and Largest Manufacturers of Industrial Infra-red Ovens

SMALL PARTS TUMBLED CLEAN



in this new DETREX ROTARY DRUM WASHER

Parts to be cleaned go into the hopper at one end of this new Detrex washer. A few minutes later they pour out of a chute and into a tote pan at the other end, clean and ready for the next production step.

In this short time, the parts are soaked, sprayed with cleaning solution, and drained—all the while traveling forward through the rotary drum.

Compact, entirely self-contained, the new Detrex rotary drum washer is economically priced, and is sturdily built to last. The charging box, spray nozzles, drive mechanism, and other working parts are readily accessible and maintenance is negligible.

Other models available incorporate multiple stages of spray wash, rinse, and hot dryoff.

Write today for complete information on Detrex metal parts washers.

DETREX DETROIT, MICH.

DETREX Corporation

BOX 501, DETROIT 32, MICHIGAN